

IRON AGE

DECEMBER 6, 1951
VOL. 168, NO. 23

THE IRON AGE
Editorial, Advertising and Circulation
Offices, 100 E. 42nd St., N. Y. 17, N. Y.

GEORGE T. HOOK, Publisher
TOM C. CAMPBELL, Editor

EDITORIAL STAFF

Managing Editor George F. Sullivan
Technical Editor Darwyn I. Brown
News-Markets Editor Wm. V. Packard
Machinery Editor George Elvers
Associate Editors H. W. Van Camp,
F. J. Winters, R. L. Hatschek, John
Kolb, Ted Metaxas, W. B. Olson;
Assistant Editor, G. G. Carr; Art
Director: Carl Cerminaro; Regional
Editors: E. C. Beaudet, Chicago; W. W.
Taylor, Cleveland; W. G. Patton, De-
troit; John B. Delaney, Pittsburgh; R. T.
Reinhardt, San Francisco; George H.
Baker, Karl Rannells, Ray M. Stroupe,
Washington. Correspondents Fred L.
Allen, Birmingham; N. Levenson, Bos-
ton; Fred Edmunds, Los Angeles; James
Douglas, Seattle; Ray Edmonds, St.
Louis; F. Sanderson, Toronto; F. H.
Harley, London, England; Chilton Ed-
itorial Board: Paul Wooton, Washington.

BUSINESS STAFF

Production Manager B. H. Hayes
Director of Research Oliver Johnson
Mgr. Circul'n & Promotion C. T. Post
Asst. Promotion Mgr. James A. Criles
Asst. Dir. of Research Wm. Laimbeer

REGIONAL BUSINESS MANAGERS

B. L. Herman, Philadelphia; Stanley J.
Smith, Chicago; Peirce Lewis, Detroit;
Paul Bachman, New England; Charles
R. Lippold, Cleveland; R. Raymond
Kay, Los Angeles; C. H. Ober, New
York; J. M. Spackman, Pittsburgh;
Harry Becker, European Representative.

REGIONAL OFFICES

Chicago 3, 10 S. LaSalle St.; Cleveland
14, 1016 National City Bank Bldg.; De-
troit 2, 103 Pallister Ave.; Los Angeles
28, 2420 Chermoy Ave.; New England,
62 La Salle Rd., W. Hartford 7; New
York 17, 100 E. 42nd St.; Philadelphia
39, 56th & Chestnut Sts.; Pittsburgh 22,
814 Park Bldg.; San Francisco 3, 1355
Market St.; Washington 4, National
Press Bldg.; European, 111 Thorley
Lane, Timperley, Cheshire, England.

Circulation Representatives: Thomas
Scott, James Richardson.

One of the Publications Owned and
Published by Chilton Co., Inc., Chest-
nut & 56th Sts., Philadelphia 39, Pa.

OFFICERS AND DIRECTORS

JOS. S. HILDRETH, President

Vice-Presidents: Everitt B. Terhune, G.
C. Buzby, P. M. Fahrendorf, Harry V.
Duffy; William H. Vallar, Treasurer;
John Blair Moffett, Secretary; Maurice
E. Cox, George T. Hook, Tom C.
Campbell, Frank E. Tighe, L. V. Row-
lands, Directors. George Maiswinkle,
Asst. Treas.

Indexed in the Industrial Arts Index
and the Engineering Index. Published
every Thursday by the CHILTON CO.
(INC.), Chestnut & 56th Sts., Phila-
delphia 39, Pa. Entered as second class
matter, Nov. 8, 1932, at the Post Office
at Philadelphia under the act of March
3, 1879. \$8 yearly in United States, its
territories and Canada; other Western
Hemisphere Countries \$15; other For-
eign Countries, \$25 per year. Single
Copies 35c. Annual Review and Metal
Industry Facts Issue, \$2.00. Cable ad-
dress "Ironage" N. Y.



Audit Bureau
of
Circulations



Society of
Business Magazine
Editors



Controlled
Circulation
Audit



National
Business
Publications

Copyright, 1951, by Chilton Co. (Inc.)

CONTENTS

*Starred items are digested on opposite page.

EDITORIAL Let's Start Over Again. 7

NEWS OF INDUSTRY

- *Special Report: Four Ways to Recover Manganese. 111
- *Production: Oil Well Drilling Record Seen. 113
- Research: Introduce Two New Lead Cladding Processes. 114
- *Raw Materials: Beneficiating non-magnetic Taconite. 115
- *Scrap Need Spotlights Old Ships. 116
- *Labor: Materials Costs Figure in Wage Talks. 117
- Controls: No Warehouse Price Rollback Seen. 118
- Defense Contracts. 121
- Construction Steel News. 126
- Industrial Briefs. 132
- Personnel: Iron Age Salutes. 143
- Iron Age Introduces. 145
- Clearing House. 252

NEWS ANALYSIS

- Newsfront. 109
- This Week in Washington. 129
- *Automotive Assembly Line. 134
- *West Coast Report. 139
- Machine Tool High Spots. 141

TECHNICAL ARTICLES

- *Electroforming Solves Special Production Problems. 151
- New Camera Takes 100,000 Frames Per Second. 153
- Cermets May Answer Jet Designers' Prayers, Part II. 154
- Toxic Metals Produce New Industrial Disease Problems. 158
- *Rare Earths Improve Forgeability of Stainless. 162
- Warehouse Adds Rolling, Annealing Facilities. 164
- *Unique Tools Speed Hydraulic Valves Production. 166

MARKETS & PRICES

- *The Iron Age Summary—Steel Outlook. 225
- Market Briefs. 227
- Nonferrous Markets. 228
- Iron and Steel Scrap Markets. 230
- Iron and Steel Scrap Prices. 232
- Comparison of Prices. 234
- Steel Prices. 236
- Warehouse Prices. 239

REGULAR DEPARTMENTS

- Fatigue Cracks. 9
- Dear Editor. 11
- Conventions and Meetings. 13
- Free Publications. 175
- New Equipment. 180

INDEX OF ADVERTISERS. 266

THE IRON AGE

IRON AGE

DECEMBER 6, 1951
VOL. 168, NO. 23

THE IRON AGE
Editorial, Advertising and Circulation
Offices, 100 E. 42nd St., N. Y. 17, N. Y.

GEORGE T. HOOK, Publisher
TOM C. CAMPBELL, Editor

EDITORIAL STAFF

Managing Editor George F. Sullivan
Technical Editor Darwyn I. Brown
News-Markets Editor Wm. V. Packard
Machinery Editor George Elvers
Associate Editors H. W. Van Camp,
F. J. Winters, R. L. Hatschek, John
Kolb, Ted Metaxas, W. B. Olson;
Assistant Editor, G. G. Carr; Art
Director: Carl Cerminaro; Regional
Editors: E. C. Beaudet, Chicago; W. W.
Taylor, Cleveland; W. G. Patton, De-
troit; John B. Delaney, Pittsburgh; R. T.
Reinhardt, San Francisco; George H.
Baker, Karl Rannells, Ray M. Stroupe,
Washington. Correspondents Fred L.
Allen, Birmingham; N. Levenson, Bos-
ton; Fred Edmunds, Los Angeles; James
Douglas, Seattle; Ray Edmonds, St.
Louis; F. Sanderson, Toronto; F. H.
Harley, London, England; Chilton Ed-
itorial Board: Paul Wooton, Washington.

BUSINESS STAFF

Production Manager B. H. Hayes
Director of Research Oliver Johnson
Mgr. Circul'n & Promotion C. T. Post
Asst. Promotion Mgr. James A. Criles
Asst. Dir. of Research Wm. Laimbeer

REGIONAL BUSINESS MANAGERS

B. L. Herman, Philadelphia; Stanley J.
Smith, Chicago; Peirce Lewis, Detroit;
Paul Bachman, New England; Charles
R. Lippold, Cleveland; R. Raymond
Kay, Los Angeles; C. H. Ober, New
York; J. M. Spackman, Pittsburgh;
Harry Becker, European Representative.

REGIONAL OFFICES

Chicago 3, 10 S. LaSalle St.; Cleveland
14, 1016 National City Bank Bldg.; De-
troit 2, 103 Pallister Ave.; Los Angeles
28, 2420 Chermoy Ave.; New England,
62 La Salle Rd., W. Hartford 7; New
York 17, 100 E. 42nd St.; Philadelphia
39, 56th & Chestnut Sts.; Pittsburgh 22,
814 Park Bldg.; San Francisco 3, 1355
Market St.; Washington 4, National
Press Bldg.; European, 111 Thorley
Lane, Timperley, Cheshire, England.

Circulation Representatives: Thomas
Scott, James Richardson.

One of the Publications Owned and
Published by Chilton Co., Inc., Chest-
nut & 56th Sts., Philadelphia 39, Pa.

OFFICERS AND DIRECTORS

JOS. S. HILDRETH, President

Vice-Presidents: Everitt B. Terhune, G.
C. Buzby, P. M. Fahrendorf, Harry V.
Duffy; William H. Vallar, Treasurer;
John Blair Moffett, Secretary; Maurice
E. Cox, George T. Hook, Tom C.
Campbell, Frank E. Tighe, L. V. Row-
lands, Directors. George Maiswinkle,
Asst. Treas.

Indexed in the Industrial Arts Index
and the Engineering Index. Published
every Thursday by the CHILTON CO.
(INC.), Chestnut & 56th Sts., Phila-
delphia 39, Pa. Entered as second class
matter, Nov. 8, 1932, at the Post Office
at Philadelphia under the act of March
3, 1879. \$8 yearly in United States, its
territories and Canada; other Western
Hemisphere Countries \$15; other For-
eign Countries, \$25 per year. Single
Copies 35c. Annual Review and Metal
Industry Facts Issue, \$2.00. Cable ad-
dress "Ironage" N. Y.



Audit Bureau
of
Circulations



Society of
Business Magazine
Editors



Controlled
Circulation
Audit



National
Business
Publications

Copyright, 1951, by Chilton Co. (Inc.)

CONTENTS

*Starred items are digested on opposite page.

EDITORIAL Let's Start Over Again. 7

NEWS OF INDUSTRY

- *Special Report: Four Ways to Recover Manganese. 111
- *Production: Oil Well Drilling Record Seen. 113
- Research: Introduce Two New Lead Cladding Processes. 114
- *Raw Materials: Beneficiating non-magnetic Taconite. 115
- *Scrap Need Spotlights Old Ships. 116
- *Labor: Materials Costs Figure in Wage Talks. 117
- Controls: No Warehouse Price Rollback Seen. 118
- Defense Contracts. 121
- Construction Steel News. 126
- Industrial Briefs. 132
- Personnel: Iron Age Salutes. 143
- Iron Age Introduces. 145
- Clearing House. 252

NEWS ANALYSIS

- Newsfront. 109
- This Week in Washington. 129
- *Automotive Assembly Line. 134
- *West Coast Report. 139
- Machine Tool High Spots. 141

TECHNICAL ARTICLES

- *Electroforming Solves Special Production Problems. 151
- New Camera Takes 100,000 Frames Per Second. 153
- Cermets May Answer Jet Designers' Prayers, Part II. 154
- Toxic Metals Produce New Industrial Disease Problems. 158
- *Rare Earths Improve Forgeability of Stainless. 162
- Warehouse Adds Rolling, Annealing Facilities. 164
- *Unique Tools Speed Hydraulic Valves Production. 166

MARKETS & PRICES

- *The Iron Age Summary—Steel Outlook. 225
- Market Briefs. 227
- Nonferrous Markets. 228
- Iron and Steel Scrap Markets. 230
- Iron and Steel Scrap Prices. 232
- Comparison of Prices. 234
- Steel Prices. 236
- Warehouse Prices. 239

REGULAR DEPARTMENTS

- Fatigue Cracks. 9
- Dear Editor. 11
- Conventions and Meetings. 13
- Free Publications. 175
- New Equipment. 180

INDEX OF ADVERTISERS. 266

THE IRON AGE

DIGEST

of the week in metalworking

FOUR WAYS TO GET MANGANESE FROM SLAG

PAGE 111 Industry is working on four ways to recover scarce manganese from basic openhearth slag—previously junked as useless. The method of the Bureau of Mines, Pittsburgh, seems nearest to commercial application. One firm may build a plant using this blast furnace technique at Wilkes-Barre.

NEW OIL WELL DRILLING SETS A RECORD

PAGE 113 Although badgered by shortages of certain sizes of pipe the oil industry is setting a new oil well drilling record. The 44,000 well goal set by Washington will be topped. Estimates now put the number of new wells this year at a peak 44,494. Steel industry's surprising output has paved the way.

HUMBOLDT ORE PROCESS STEP BY STEP

PAGE 115 The first try at producing iron concentrates from low-grade non-magnetic ore by the flotation process will be made by Ford and Cleveland-Cliffs at Humboldt, Mich. Process is described step by step. By 1955 Ford expects to draw 10 pct of its needs from the plant. Pelletizing is under study.

ASK NAVY OK TO SCRAP 28 STORED SHIPS

PAGE 116 Stockpiles of scrap iron and steel have been razed almost flat. The shortage puts the spotlight on our fleet of mothballed ships. Steel consumers want more of them put into salvage but the Navy says that sudden war would catch us short. A list of 28 salvageable ships has been resubmitted.

MATERIALS WILL FIGURE IN WAGE TALKS

PAGE 117 Steel firms will use non-labor cost increases as an argument against wage increases. These costs have accumulated for more than a year without pricing relief. Raw materials and freight in particular have advanced seriously. Price rises have covered new labor costs only, industrialists say.

NEW ENGINE PROGRAMS ARE STILL ACTIVE

PAGE 134 High compression projects have not been shelved. At least three companies are still actively pushing new designs. Skilled labor remains the biggest shortage in the Detroit area. Suppliers of MRO parts say it is easier to get steel now. Dealers are knocking the K-F-Sears auto sales deal.

WESTERN MILLS IN ON U.K. BARTER DEAL

PAGE 139 At least two mills will start shipping steel to England this month. Scrap remains a headache to all steel producers in the area. Western steel supplies are following the national pattern, and both supply and demand are rising. Make report on effectiveness of smog control measures.

ELECTROFORMING SOLVES TOUGH PROBLEMS

PAGE 151 Extra-sharp corners and points, intricate contours, and especially tight tolerances are some of the production difficulties electroforming can solve. The method is equally adaptable to short experimental runs or to large production runs. So it is especially useful in developing new products.

RARE EARTHS UP STAINLESS FORGEABILITY

PAGE 162 This field is one of the most important developments in basic steelmaking in recent years. Carpenter Steel's application of rare earths to stainless is a noteworthy advancement to the practice. Stainless steels not commercially available previously can now be rolled and forged with ease.

UNIQUE TOOLS USED TO MAKE VALVE PARTS

PAGE 166 Unusual fixtures save time and labor in production and checking of hydraulic valve parts at Electrol. Among interesting setups is a Warner & Swasey automatic producing 262 parts per hour with fine surface finish to close limits. Another is a 6-spindle machine to speed poppet valve lapping.

BAD GUESSES CONFUSE STAINLESS OUTLOOK

PAGE 225 Alloy and stainless steel outlook is badly muddled by wrong guesses in Washington. Although these are about the tightest items in the market, some favored users haven't taken all they were allotted. Other less favored users would like to have more. Prospect is for unused space on some mills.

WHAT ARE ELECTRIC FURNACE SIZE LIMITS?

NEXT WEEK Barring unforeseen electric developments, arc furnaces will probably be built in sizes smaller than 150-ton units. Furnaces will be better but physical and electrical factors will limit size. When current through transformer, busses, and electrodes goes up, losses become much greater.

UNIVERSITY OF MICHIGAN LIBRARIES
UNIVERSITY OF MICHIGAN LIBRARIES



building industry uses

Cincinnati Press Brakes for multiple bends

Cincinnati Press Brakes are forming multiple bends in one hit on this aluminum siding—a high production item.

Economies—through speed, accuracy of performance and minimum handling—are giving low cost per piece.

Window and door frames, gutters, structural members and other items of the building

industry are being produced on Cincinnati Press Brakes with parallel economies.

The unusual accuracy and great versatility of Cincinnati Press Brakes make them very profitable both for this production job and for jobbing work. Cincinnati Press Brakes produce a quality product at a low cost. They are a profitable investment.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

Write for comprehensive illustrated catalog—B-2-A—covering construction and many uses of Cincinnati All-Steel Press Brakes.

Let's Start Over Again

NEVER in peacetime has this country been under such strict government controls. The excuse has been to speed the defense program.

After almost 6 months of a Controlled Materials Plan—which originally was to take care of military needs only—we have more confusion, pressure and politics than ever. Complete distribution of steel, aluminum and copper is under a government setup that leaves plenty to the imagination.

It is begging the issue to have top mobilization officials cry that dead cats are being thrown at them. Some are live cats but they will be dead soon if the monstrosity of material controls continues as it is now.

A visit to plants where civilians are trying to speed the defense program would be an eye opener for some Washington people. Things not needed for a year or two are now half to three quarters completed—and stymied by red tape.

Urgently needed items—security prevents details—are being held up due to ignorance, inexperience and bureaucracy. Some firms have needed materials but can't sell them until government says so. Some of their customers want what they have but are without tickets. Others have far more tickets than they need. Everyone has "played safe" with his "demands."

The horrible mistake has been the audacity of some people to believe that in peacetime any man or group of men has enough brains and understanding to control the needs and supplies for hundreds of thousands of producers and customers.

Were this an all-out war there would be only one customer—Uncle Sam. This is not an all-out war. There are millions of customers. Some buy butter—some guns.

Let us stop this horseplay and immediately do away with material controls over everything except military needs.

Before it is too late, let's go ahead with strictly defense items—with priorities if necessary. Let's leave the rest to those who know it best.

Tom Campbell

Editor



NO SCRAP... NO STEEL!



SCRAPPY SAYS:

AID DEFENSE
MORE SCRAP
TODAY...
MORE STEEL
TOMORROW



THE iron and steel industry faces a serious scrap shortage, growing more critical every day. . . . It will be impossible for producers to make the steel tonnages demanded for rearmament and essential civilian needs, unless consumers cooperate by furnishing more scrap. . . . Most desperately needed now is heavy industrial iron and steel scrap. . . . Keep the cobwebs from gathering at your own plant by turning in more of your own scrap today.

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio

Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

Fatigue Cracks

By Charles T. Post

Shoot Santa

Karl Rannells, your favorite family journal's Washington man of parts, comments that mink coats, deep freezes, and other physical inducements temporarily are in disrepute for swinging favorable decisions from Washington agency heads, but that now psychology is being brought to bear. This sometimes results in the officials finding themselves backed into the old "Have you stopped beating your wife?" predicament.

Not long ago, Rannells relates, a toy manufacturer stomped into Manly Fleischmann's office, determined to do something about having his materials allotment increased. The control chief remained unmoved after arguments implying that juvenile delinquency would increase, that the nation would go to rack and ruin unless Young America got its normal quota of the particular product. As he left, the frustrated business man tossed a final withering shot: "Tell me," he demanded, "are you for kids or aren't you?"

Cost of Living

In our file tabbed "Seven Ages of Man" we are placing Amendment 21 to the Office of Price Stabilization's Ceiling Price Order No. 30. The amendment makes clear that price ceilings under the regulation cover not only automotive trucks, motorcycles, and buses, and the like—but also hearses, ambulances, house trailers and motor scooters. From the day Little Willie mounts his first motor scooter, through the harrowing motorcycle age, through his days of domesticity in a house trailer, yea, until the day after he dies, the OPS watches over his locomotion. The cost of living and cost of dying are held in check impartially.

Stroke of Pen

Reading a *New York Times* dispatch from Washington last week, we suddenly were struck with the fact that actually the steel industry is doing nothing—positively nothing, friends—to alleviate the steel situation. If things get any better, it will be entirely due to Washington. In the words of DPA Administrator Manly Fleischmann,

himself, his outfit is accomplishing "miracles":

"What we've accomplished for the schools in a time of steel shortage is nothing short of a miracle," the *Times* quotes him as telling a Congressional committee.

Actually, it turns out that the "miracle" was the action of the DPA in increasing the steel allotment for schools by 15,000 tons, an achievement accomplished with the stroke of a pen. Today the pen is mightier than the openhearth.

Mountain Boys

The dove of peace has descended in Chicago, of all places, and made brethren of mortal enemies. Your f.f.j.'s Stan Smith, who gets around the Windy City a lot, discussed business with a Flash Cab Co. ("Chicago's First Radio Dispatched Cabs") driver the other day and learned that the co-owners of the outfit were Martin and Coy.

Urgent

Our farm friends, no doubt, will understand the action of the OPS in exempting corn cobs from price control "in order to stimulate their collection". The OPS mutters something about national defense needs, but we can see that wily leer in its left eye. After all, Ward's is getting stingy with its catalogs these days.

Puzzlers

The answer to last week's puzzler was $13\frac{1}{4}$ in. between the first page of the first volume and the last page of the last.

B. Mitchell, Smith & Wesson, Inc., points out that it would take 6 hr and 11 sec for the clock to strike twelve. Guess he is right but we'll also accept the answers of F. P. Boulais, Campbell Soup Co., and R. W. Huff, Canton, Ohio, who only mentioned the 11 sec. C. E. Blass, Talon, Inc., has worked out the three hole problem and R. S. Fisher, National Carbon Co., has just finished counting the amoebae.

If you can do this one in less than 30 min you're underpaid. What number when multiplied successively by 1, 2, 3, 4, 5 and 6 gives products which contain the same digits arranged in the same succession.

Lapping
Carbide
20% Faster!

Carbide spray nozzle orifices are finished to tolerances of .0005" at Spraying Systems Company, Bellwood, Illinois. New Elgin DYMO-C diamond abrasive used in place of diamond powder-oil mixture produces more pieces per hour and conserves diamond, tool.

ELGIN
DYMO-C*
diamond abrasives

*C FOR CARBIDE

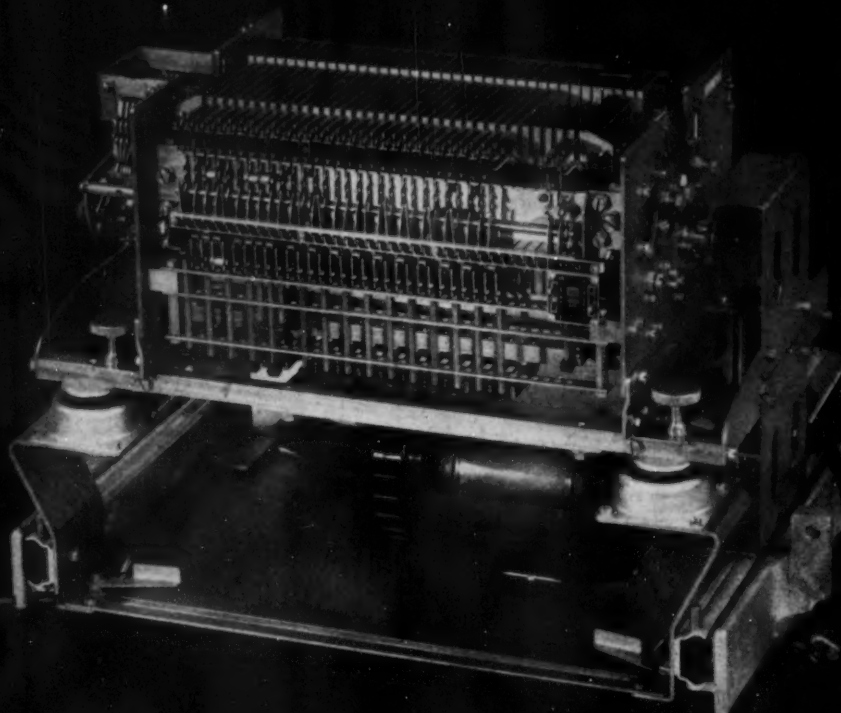
Here is a complete new diamond abrasive specially prepared to speed carbide finishing operations. It cuts faster, won't work back on the lap, won't settle and comes ready to use without time-consuming mixing. Write for complete information—ask for a free demonstration.

ALL ELGIN DIAMOND ABRASIVES ARE COMPLETELY PRODUCED BY ELGIN AND CERTIFIED TO CONFORM TO U. S. BUREAU OF STANDARDS SPECIFICATIONS.

ABRASIVES DIVISION

ELGIN NATIONAL WATCH CO.
ELGIN, ILLINOIS

R_{eadin'}, R_{ecognizin'} and R_{espondin'}...



SHARON* SPECIAL ALLOY USED BY TELETYPE† IN AMAZING NEW SEQUENTIAL CONTROL...

Teletype Corporation recently produced a compact machine that actually knows its Three R's. In this case the R's are Reading, Recognizing and Responding. It will Read every signal coming over a Teletype† line, Recognize predetermined sequences of the signal and Respond automatically.

The design of this machine calls for analyses of alloy steels that must be

worked to exceptionally close tolerances. Teletype† found many of the alloys required in exactly the right analyses and uniformity simply by contacting their Sharon representative. If you have a job that calls for a special alloy, coated or stainless steel strip, the name Sharon belongs high on your supplier list.

† TM of Teletype Corporation

*Specialists in STAINLESS, ALLOY, COLD ROLLED and COATED Strip Steels.

SHARON STEEL CORPORATION

Sharon, Pennsylvania

DISTRICT SALES OFFICES: CHICAGO, ILL., CINCINNATI, O., CLEVELAND, O., DAYTON, O., DETROIT, MICH., INDIANAPOLIS, IND., MILWAUKEE, WIS., NEW YORK, N. Y., PHILADELPHIA, PENNA., ROCHESTER, N. Y., LOS ANGELES, CALIF., SAN FRANCISCO, CALIF., MONTREAL, QUE., TORONTO, ONT.

For information on Titanium Developments contact Mullery-Sharon Titanium Corp., Indianapolis 6

SHARONSTEEL

Dear Editor:

Letters from readers

Round We Go

Sir:
We should like to reproduce in our house organ the editorial "Round We Go" which appeared in your Nov. 15 issue.

K. M. SCOTT
Advertising Manager
Northwestern Steel & Wire Co.
Sterling, Ill.

Proving Worth

Sir:
As a reader of THE IRON AGE I want to take this opportunity to express my appreciation of the many fine articles D. I. Brown, your technical editor, has contributed to your magazine, specifically his article on resin makers in the Nov. 15 issue. Information contained in this article has been helpful in work currently undertaken by this department on the handling of resins.

C. W. RACK
Mgr.-Technical Service Dept.
Oakite Products, Inc.
New York

Student Training

Sir:
May we have your permission to use in our classes the article: "Integration: Security in Finishing" by J. B. Delaney? We wish to reproduce copies of this article for distribution to students as classroom study and discussion material.

M. J. BARLOON
Chairman—Dept. of Economics
Western Reserve University
Cleveland

Titanium Slag

Sir:
I have read with great interest your recent articles entitled "More Titanium Oxide Now Available."

One of the prime requisites of a titanium oxide concentrate, as you doubtless are aware, is that for pigment purposes the material must be readily soluble in sulfuric acid. We have had small amounts of this slag and find it very difficult to put it into solution.

I judge this problem has been solved, otherwise the paint industry would not have accepted this slag. Do you know if anything has been published dealing with this phase of matters?

H. S. COOPER
Director of Research
Cooper Metallurgical Associates
Cleveland

Users of titanium slag now report 95 to 99 pct digestibility in sulfuric acid as a regular matter of course. We know of no published information dealing with this particu-

lar phase, but we suggest you contact Dr. George Stutz, director of research, New Jersey Zinc Co., Palmerton, Pa., one of the men who helped solve the initial troubles.—Ed.

Joining Aluminum

Sir:
We are interested in learning if any method has yet been devised for welding, soldering or brazing round aluminum wire of small diameter.

C. J. SCHNELLE
Vice-President—Purchases
The Acme Wire Co.
New Haven, Conn.

We suggest you contact Frank Jardine of Aluminum Co. of America, Cleveland. They have recently installed a system of joining aluminum wires based on a former German method that is extremely fast and produces an excellent bond.—Ed.

New Drill

Sir:
We have read with much interest the article "New Drill Boosts Coal Output" in your Nov. 1 issue.

If it would not be betraying a confidence, we would be very glad to have you identify the mine at which this new coal mining machine is used.

F. O. HARRIS
Vice-President
Cannelton Coal & Coke Co.
Cannelton, W. Va.

More information on the new coal mining machine can be supplied by the Bituminous Coal Institute, 320 Southern Bldg., Washington, D. C.—Ed.

Measuring Device

Sir:
Would you kindly supply us with full information on the moisture measuring device mentioned on p. 69 of your Nov. 15 issue.

M. E. BAFARO
Engineer
American Flange & Mfg. Co., Inc.
Chicago

Further information can be obtained from the American Instrument Co., 8030 Georgia Ave., Silver Spring, Md.—Ed.

Kirksite

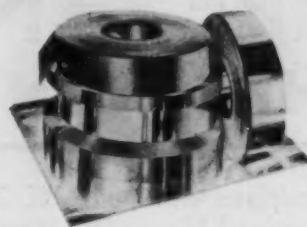
Sir:
Recently you had a write-up on a material called Kirksite for the manufacture of molds.

We are interested in obtaining the manufacturer of this item so that we may contact them.

M. A. JAFFE
Paul-Martin Rubber Corp.
Holyoke, Mass.

Contact the Kirksite Div., National Lead Co., 111 Broadway, New York 6, N. Y.—Ed.

LET'S TALK FLAT ROLLED STEEL PRODUCTS



Specializing in flat rolled metal products assures you a greater than usual interest for requirements in this range. Kenilworth's modern equipment and facilities are geared for almost instant service when order processing begins. So, when you have a need for spring steel (annealed or tempered), stainless sheets or coils, tin coated steel, shim steel and other flat rolled products, try Kenilworth first.

LET'S TALK ABOUT SUPPLY



Today's controlled and critical supply may be hurting you more than necessary. While our inventory varies, from day to day, it may be possible to assist you with your very need now. You can be certain you will get immediate and interested attention with an instant response of current availabilities.

LET'S TALK TO...



750 BOULEVARD
KENILWORTH, N. J.

SPECIALISTS IN FLAT ROLLED METAL PRODUCTS

Telephones: N. Y. COntlands 7-2427
N. J. UNionville 2-6900
Teletype: Roselle, N. J., 387

LET'S TALK ABOUT ALL OF KENILWORTH'S SERVICE

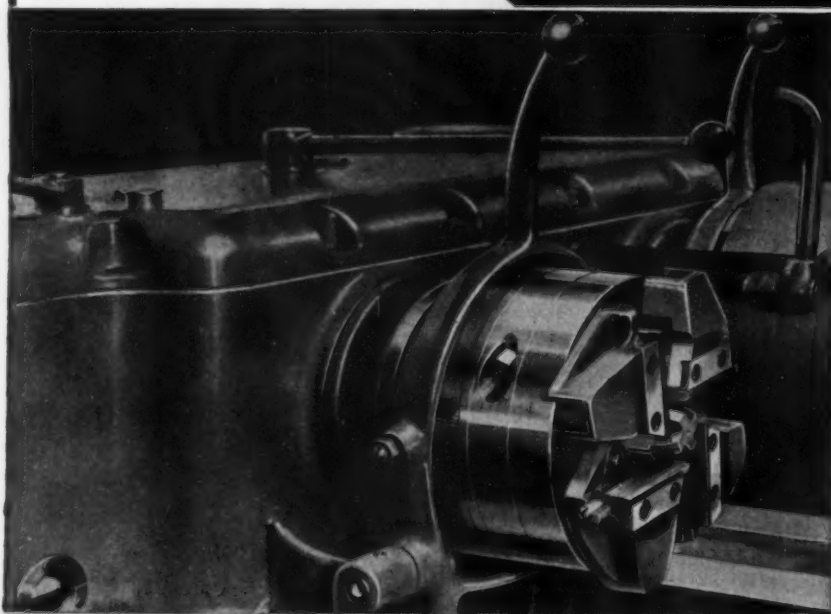
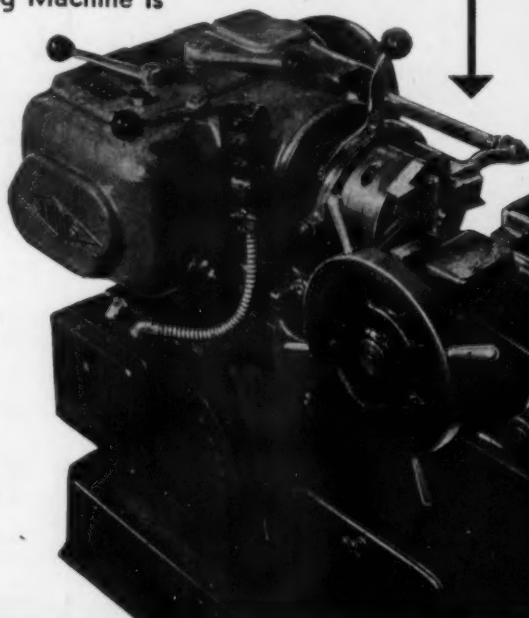
Custom slitting and shearing service for your metals to handle sizes from .001" to .187" in widths up to 36" is available — precision equipment assures minimum camber, minimum burr and closer than standard tolerances when required.

LANDMACO PIPE AND NIPPLE THREADING MACHINES

- THREADS
 - REAMS
 - CHAMFERS
- IN ONE OPERATION

Equipped with the LANCO Semi-Receding Internally Tripped Pipe and Nipple Die Head, the LANDMACO Single Head Pipe and Nipple Threading Machine is illustrated producing 1 1/4" diameter tapered pipe threads on blank steel pipe. Operating at approximately 63 R. P. M., the machine is producing nipples at the rate of 112 per hour.

The LANDMACO is essentially a high-production hand-operated tool. It is built in both single and double head models, in 1 1/4" and 2" sizes, and equipped with LANCO Internally Tripped Pipe and Nipple Die Heads.



• LANCO Pipe and Nipple Die Heads are designed for use on hand-operated pipe and nipple threading machines to perform threading, reaming, and chamfering operations simultaneously.

The Semi-Receding Internally Tripped Head is used for producing nipples and for threading long lengths of pipe. The receding action causes the chasers to recede or diametrically expand in cutting the thread. This assures accuracy of the thread taper, eliminates leave-off marks, and increases chaser life.

Write for Bulletins D-67 and D-84



LANDIS MACHINE CO.

WAYNESBORO, PA., U. S. A.

Conventions & Meetings

Dec. 6-7—National Assn. of Manufacturers, annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 14 W. 49th St., New York.

Dec. 6-8—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Hotel William Penn, Pittsburgh. Institute headquarters are at 29 W. 39th St., New York.

Dec. 10—Can Manufacturers Institute, annual meeting, Waldorf-Astoria Hotel, New York. Institute headquarters are at 1126 Shoreham Bldg., Washington.

1952

Jan. 5—American Home Laundry Manufacturers Assn., annual meeting, Morrison Hotel, Chicago. Association headquarters are at 38 S. Dearborn St., Chicago.

Jan. 8—Mining & Metallurgical Society of America, annual meeting, Mining Club, New York. Society headquarters are at 11 Broadway, New York.

Jan. 8-9—Power Crane & Shovel Assn., annual meeting, Washington, D. C. Association headquarters are at 74 Trinity Place, New York.

Jan. 8-10—National Constructors Assn., annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 50 E. 41st St., New York.

Jan. 10-11—Aluminum Window Manufacturers Assn., annual meeting, Miami. Association headquarters are at 74 Trinity Place, New York.

Jan. 13-15—Institute of Scrap Iron & Steel, annual convention, Waldorf-Astoria, New York. Institute headquarters are at 1729 H St., N.W., Washington.

Jan. 14-17—American Management Assn., general management conference, Biltmore Hotel, Los Angeles. Association headquarters are at 330 W. 42nd St., New York.

Jan. 14-17—Plant Maintenance show and conference, Convention Hall, Philadelphia. Exposition management, Clapp & Pollak, Inc., 341 Madison Ave., New York.

Jan. 14-16—Society of Automotive Engineers, annual meeting, Hotel Book-Cadillac, Detroit. Society headquarters are at 29 W. 39th St., New York.

Jan. 16-18—Society of Plastics Engineers, annual national technical conference, Edgewater Beach Hotel, Chicago. Society headquarters are at 409 Security Bank Bldg., Athens, Ohio.

Jan. 17—Steel Shipbuilding Institute, winter meeting, Hampshire House, New York. Association headquarters are at 600 Fifth Ave., New York.

Jan. 18—Malleable Founders' Society, semi-annual meeting, Hotel Cleveland, Cleveland. Society headquarters are in the Union Commerce Bldg., Cleveland.

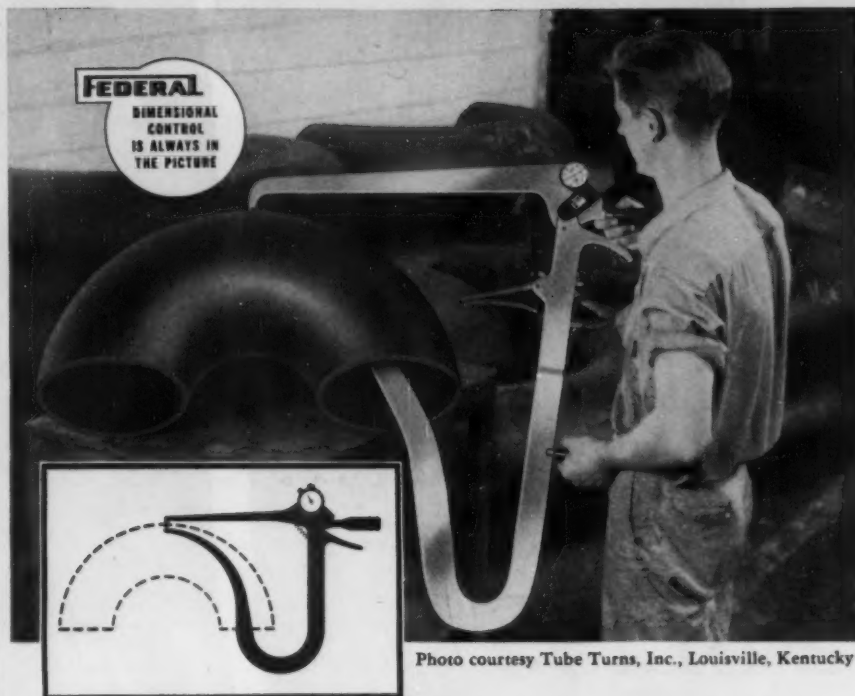


Photo courtesy Tube Turns, Inc., Louisville, Kentucky

Fingers of Steel Show the Thickness

Another industry served by Federal Gages

This long-fingered Federal Caliper Gage reaches into the pipe fitting and shows on the Dial Indicator exactly what the wall thickness is. It's one of the simplest Gages we make (we make them for internal dimensions, too) — yet you can easily understand how important it is to this prominent manufacturer of welding fittings. No fittings leave the plant that can't pass the wall thickness test . . . that can't prove their worth by this or other Federal Caliper Gages.

Many are the companies which use Federal Gages as their final authority on dimensional quality. Products made of all types of materials — plastics, metals, paper, glass, rubber, fabrics — are gaged for dimensional accuracy on Federal Indicating-Type Gages. Some jobs are handled by our stock, catalog Gages. Others require special handling — a new twist in gage design or construction that makes the gage right for its own particular job . . . easy to use, easy to read, fast, and above all economical.

Take advantage of our experience gained in designing and building over 20,000 different gages. If dimensional control is your problem, consult Federal first. It's the natural — the wise thing to do. Federal Products Corporation, 1312 Eddy St., Providence 1, R. I.



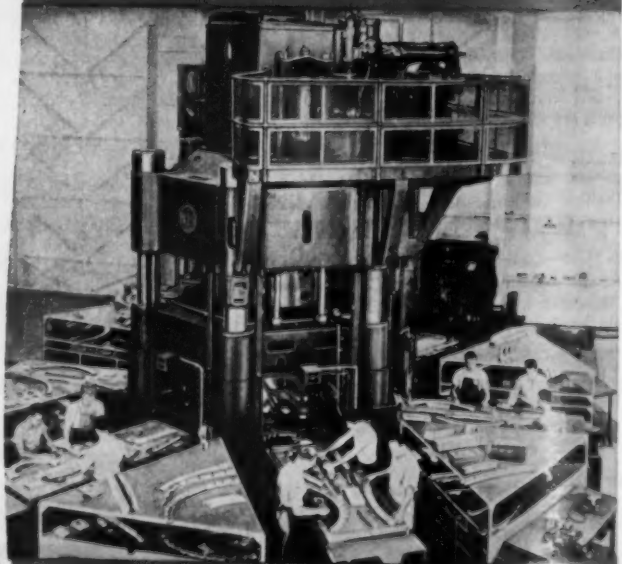
For
Sheet, Plate
or Powder...
a BLISS
Hydraulic
Press
for Every
Operation



DRAWING



REDRAWING



RUBBER PAD FORMING

THE IRON AGE Newsfront

- ▶ French steel mills exporting 20 pct of their production are now taking new orders at the reduced rate of 6 pct in order to meet increased civilian and armament requirements.
- ▶ The Perrin process for desulfurization is again under test by some steel producers. This French process long known but little used in this country employs a fifty-fifty calcium-aluminate slag in the steel ladle. Sulfur can be reduced as much as 60 pct quickly and accurately with proper techniques.
- ▶ Latest wrinkle in secrecy of new industrial developments is Congressional pressure in high places - in Washington. Certain constituents, for their own private gain, have been successful through these channels in getting government restrictions on developments which would have been publicized otherwise.
- ▶ European industrialists report NATO is going to place large orders for equipment in western European countries to increase their arms output after the first of the year.
- ▶ Chromizing from molten salt solutions has been satisfactorily developed. Many metals can be so plated by this simple dip process. Cast iron, stainless steel, molybdenum and many other metals have been chromized.
- ▶ Recent practice on the making of boron steels shows considerable merit in the use of two or more additive agents to the steel ladle instead of a single ferroboration alloy.
- ▶ High-temperature tests on titanium show that the metal and its present alloys fall far short of expectations. The next new metal that may be fully tested for high-temperature applications is ductile vanadium.
- ▶ Next metal processing development of chief interest to the metalworking industry may be an automatic transfer line for forgings. One such project is already well advanced.
- ▶ The scrap outlook has taken a turn for the worse, with weather swamis predicting a stormy winter. Look for a new note of urgency in the scrap drive. Rail and auto graveyard reclamation programs will be pushed harder, as will the industrial drive. It is likely that the need will be so great that the lowly tin can will be the subject of a now-or-never scrap test.
- ▶ Recent agreement to sell 300,000 tons of Southern Mexican iron ore to Japan at about \$8 a ton doesn't mean Mexico has changed its mind about insisting its ore reserves be smelted at home. Ore deposits being exported aren't extensive; bigger deposits in Midwestern Mexico will stay in that country.
- ▶ The government is still hot on the structural steel problem. One project brewing involves Barium Steel's Harrisburg and Phoenixville plants. Plans call for a 200,000 ton a year plate expansion at Harrisburg and about same amount for structural steel at Phoenixville including more wide flange beams. Two 800 tons a day blast furnaces are involved in the program, which if approved will exceed \$50 million. If government loans are not granted, the company, on its own, will go ahead on part of the program.

the truth about Dow Corning Silicones...



... is more fantastic than the patter of the pitchman or the spiel of the barkers that doubled in advertising and sales a generation ago. For example:

- Silicone (Class H) electrical insulation makes motors and other kinds of electrical equipment last 10 times as long as they ever did before.
- These same insulating materials are used to double the power per pound ratio in electric machines.
- Silastic,* the Dow Corning silicone rubber is used to seal hot air at 600°F., hot oil at 350-400°F., limit switches and bomb bay doors at -100°F.
- Dow Corning Silicone oils and greases make permanent lubrication a practical reality.

To many engineers and executives, such silicone facts as these still sound too good to be true. That's why we have built and assembled 16,000 pounds of demonstration units and typical applications to prove that our silicone products will do all that we claim for them. This is the first comprehensive Silicone Exposition ever assembled. Previewed in Washington, D. C. during the week of October 22nd, this exhibit will be given private showings in major industrial centers across the country.

DOW CORNING CORPORATION

ATLANTA
CHICAGO
CLEVELAND
DALLAS
LOS ANGELES

NEW YORK
WASHINGTON, D. C.

**DOW CORNING
SILICONES**

MIDLAND, MICHIGAN

In CANADA: Fiberglas Canada, Ltd., Toronto • In GREAT BRITAIN: Midland Silicones, Ltd., London

DOW CORNING SILICONE EXPOSITION now scheduled for

CLEVELAND
DETROIT
PHILADELPHIA
NEW YORK
BOSTON
PITTSBURGH
CHICAGO
WICHITA
FORT WORTH
LOS ANGELES

If you want to know more about this Exposition write for complete information including our new 32-page book which answers in simple words and pictures, the \$64 question, "What's a Silicone?" Address Department O-12

DOW CORNING
CORPORATION
Midland, Michigan

U.S. PAT. OFF.

MANGANESE: New Supply in Steel Slag

Four methods are being worked out . . . Mangus Slag, Inc., may try Bureau of Mines blast furnace process in Wilkes-Barre . . . Success may fill half of steel's manganese needs—By T. Metaxas.

Four processes to tap a reservoir of manganese dammed up during decades of steelmaking and held captive in junkpiles of "useless" basic openhearth slag are in simultaneous development in America.

A survey of manganese ore stockpiles disclosed that shortages of this essential element in steelmaking are growing more acute. Inventories in some cases are only 50 pct what they should be. Stockpiling still takes its toll. Although our foreign sources of manganese have rallied considerably since Russia withdrew its supply from the market, the upsurge is leveling off. And without imports, we couldn't keep a fraction of steel capacity stocked with manganese.

Inexhaustible Supply — While the steel industry shovels deeper into inventory, it is also approaching an era of a substantial permanent supply of domestic manganese. It will be found in the dumps of slag, brittle metallic waste of the steel melt. And the supply is inexhaustible. For, as long as openhearth steel is made slag will be a waste product.

The process reported to be nearest commercial application is that of the Bureau of Mines station in Pittsburgh. A miniature blast furnace there is producing from slag a high phosphorus spiegeleisen for conversion to a product similar to commercial grade manganese.

Major steel producers in the East are reportedly lending technological assistance to a new firm, Mangus Slag, Inc., which has tentative plans to open a manganese recovery plant in Wilkes-Barre, Pa. Mangus Slag has filed for a government contract from Defense

Materials Procurement Agency to assure a satisfactory floor price for its product. It is likely DMPA will act favorably on the contract. Other government help may also be forthcoming.

Major Buildup—If Washington arrangements are satisfactory, Mangus Slag may be producing manganese from slag brought in from a neighboring steel mill. If this plant proves successful, Mangus may build several others for a major buildup of capacity.

Mangus Slag expects to dodge the coke shortage and necessity of building coke ovens by burning anthracite coal in a 10-ft hearth blast furnace.

It is authoritatively believed Mangus Slag will duplicate on a larger scale Bureau of Mines operations in Pittsburgh. The Bureau's patent on its process has been filed under the Dept. of Interior and is in public domain. Bureau of Mines personnel report that backers of Mangus Slag have been interested visitors at the Pittsburgh station.

Thus, study of the Bureau of Mines process should furnish obvious clues as to what Mangus Slag may do at Wilkes-Barre on a larger scale. The Bureau's pygmy blast furnace blows only 500 cu ft of air per minute. It has been smelting slag resulting from openhearth operations on Mesabi Range iron ore metal. This slag has a high $7\frac{1}{2}$ pct manganese content with $21\frac{1}{2}$ pct iron and 1.2 pct phosphorus.

"Phosphospiegel" — The Bureau treats the slag in its furnace to get a high phosphorus spiegel containing from 20 to 24 pct manganese.



Slag Dump . . . new hope for manganese.

This "phosphospiegel" is then processed in a Bessemer basic acid converter. A slag charge already in the converter acts as a sponge, soaking up the oxidized manganese as it is released from the melting spiegel.

The phosphorus remains in the iron and contaminates it so badly that it is useless for steel. Most steelmakers consider phosphorus poisonous to the steel melt because of its embrittling effect. The iron may have minor commercial uses.

Out of the Bessemer converter now comes a synthetic manganese ore. Further treatment in a ferromanganese furnace yields a commercial grade product. If preferred, the synthetic ore may be briquetted. Steps are few in this process and raw materials costs are relatively low.

Also considered promising is another Bureau of Mines recovery

process being conducted at College Point, Md. Slag is treated with lime to form calcium silicate and phosphate. The iron and manganese remain as oxides and since these higher oxides are not soluble, they go through a grinding and furnacing operation while under reducing conditions. A manganese monoxide is produced and this is leached to get a manganese hydroxide in an ammonium complex. Further heating breaks the ammonium complex.

College Point reports its process as in the middle stage. It expects a new furnace early next year to accelerate research. Definite results are expected in 1952, THE IRON AGE was told.

Works on Ores — Armour Research Foundation, Chicago, is developing a versatile manganese salvage process using a cyclic chloridization technique. Although the emphasis has been on slag, Armour scientists have had almost identical success with low grade ores from Aroostook County, Maine. These contain 10 to 11 pct manganese and 25 to 30 pct iron in the form of silicates. America has centuries of manganese supply in low grade ores, too lean for present extraction practices.

Armour will open a pilot plant in the spring. (American Iron & Steel Institute is co-sponsor to both Bureau of Mines projects and the one at Armour.)

Sylvester & Co., Cleveland, has also been conducting pilot plant operations in manganese recovery. Slag is crushed, ground, and then sintered in a rotary kiln. After limestone is added in the kiln, the processed slag goes through magnetic separation equipment. The concentrate can then be melted into desired forms of manganese alloys —and the pig iron is useable.

Yardstick for measuring efficiency of the processes is economy of operation and efficiency in extracting good percentages of manganese at mass production volume. Consumption of raw materials, cost of labor, equipment, maintenance will influence acceptance.

One Bureau of Mines expert doubts that the newborn slag manganese processes will be able to reach out too deeply into the thousands of acres of slag that have accumulated over the years. Expensive equipment to screen out the garbage and debris from the slag piles may be needed before they can be touched. Steel mills regarded slag as a useless waste and used it as landfill and a dumping area.

"It will take money to separate the mattresses and dead rats from the slag junk yards," the Bureau man said.

Half of Needs — He estimates that 150 million tons of recoverable slag has piled up since World War II. Despite its condition it could serve as a vital emergency cushion. Even if old slag piles remain untouched, the rate of current slag generation can provide about half of the steel industry's annual manganese needs.

Steel mills using Mesabi Range

iron ore produce 12 million tons of slag per year. Some mills recharge less than half of their slag in their iron-producing blast furnaces, dump the rest. All slag cannot be used because of the phosphorus buildup that would contaminate the pig iron and consequently the steel.

The surplus slag would total about 7 million tons per year. The Bureau of Mines believes its furnace process can pack 90 to 95 pct of the manganese found in slag into its synthetic ore. From the ore it can extract 75 pct of the manganese.

About 475,000 tons of 80 pct manganese would thus be made available each year. This is about half of the steel industry's needs. Reliance on imports would be halved. When new methods are found to process abundant domestic low grade manganese ores, America's steel plant will be much nearer self-sufficiency.

Manganese, essential ingredient of steelmaking, may become a home-grown product.

Financial

Granite City Seeks Stock O.K.

Statement seeking the registration of 102,276 shares of cumulative preferred stock, \$100 par, has been filed with Securities & Exchange Commission by Granite City Steel Co.

Common stockholders will be given a chance to buy into the offering at the rate of one preferred share for each 12½ shares of common held.

Proceeds of the offering will be added to the general funds to aid in financing the \$40,000,000 expansion program which began last spring.

Study Surinam Power Financing

World Bank may finance new hydroelectric power plants for aluminum processing in Surinam. Bank economic mission, headed by Richard H. Demuth, arrived in Paramaribo this week to consult

with Dutch officials. Development of transportation and agricultural resources also will be under consideration during the mission's 4-week visit.

Working Capital at Record High

U. S. corporations at mid-year had reached a new high in net working capital of \$79,000,000,000, according to Securities & Exchange Commission. But cash and security holdings were only 59 pct of current liabilities against 73 pct last year.

Office of Business Economics reported that the corporate profit rate before taxes is estimated at \$45,000,000,000. After adjustment for taxes, the rate dropped to \$18,000,000,000.

Income on foreign investments, including both firms and individuals, amounted to \$2,200,000,000 during 1950, OBE reported.

OIL: New Drilling Sets Record

Pipe shortage not seriously hurting operations . . . Will pass '51 goal with good margin . . . Set sights even higher for '52 . . . Demand high, but steel can still be had—By E. C. Beaudet.

Although harassed by shortages of certain sizes of pipe, the oil industry is heading for a new oil well drilling record. The 44,000 well goal set by defense mobilization officials for 1951 will be passed with a good bit to spare. During the first half of this year 20,632 wells were completed, reports the *Oil and Gas Journal*. Last half forecast indicates 23,862 more wells will be drilled for a total of 44,494, the highest in the history of the industry.

Surprise Themselves—To keep up with this terrific pace the steel industry has been turning out huge tonnages of drill pipe, casing and tubing which some steel industry officials frankly admit they didn't think possible. Mill shipments of oil country goods were 943,666 tons during the first 6 months of 1951. This is at a higher rate than the previous record drilling year in 1950 when a total of 1,685,862 tons was shipped for the entire year.

In spite of this outstanding record, the oil industry has set even higher sights for 1952. The Petroleum Administration for Defense would like enough steel to drill 50,000 wells next year. However, in view of other defense requirements the Defense Production Administration has seen fit to continue steel allocations at the 44,000 wells a year rate for the first quarter. New steel capacity coming in next year may make possible increased allocations for the oil industry.

Steel Quotas—For the first quarter of 1952 PAD has been allotted 466,000 tons of oil country tubular goods. Of this 409,250 tons will be made available for domestic operations. This includes about 50,000 tons of third and fourth quarter carryovers and 22-

000 tons set aside in 13 regional warehouses to meet emergency demands of wildcat drillers. Foreign petroleum operations have been tentatively scheduled to receive 46,740 tons, of which 10,000 is to go to Canada.

While stocks of oil country goods have not been over-abundant for the last decade, steel industry officials believe they are ample to meet emergency requirements. In some cases the turnover has not been so great as expected, causing a warehouse in one instance to request a tonnage reduction from the mill.

Can Get—A major producer of oil country goods claims it knows of no one who wants to drill a well and can get it approved who is going without steel. However, some large oil companies are re-

ported to be still forced to revert to conversion steel to meet their needs. Foreign pipe continues to be in demand by some operators.

While demand continues at an unprecedented rate for all tubular goods, the tightest items fall within the smaller diameter ranges. Casing of 5.5 and 7 in. OD is extremely scarce and desirable. Since allocations are based on tonnage, the smaller the size an operator can practicably use, the more footage he is able to drill. With pipe mills operating at capacity there is little chance that supplies of smaller diameter pipe will be increased during the first half of the year.

Copper, Nickel Scarcest Items

Manly Fleischmann, Defense Production Administrator, last week maintained that the steel and aluminum supply will be easier for the last half 1952 but warned that supply of some other basic materials is likely to grow tighter.

"I see no possibility," he said, "of improvement in our copper and nickel supplies. These two are our worst problem."

IRON & STEEL: October Production

As Reported to American Iron & Steel Institute

DISTRICTS	BLAST FURNACE —NET TONS	Number of Companies	Annual Capacity	PIG IRON		SPIEGEL FERRO- MANGANESE		TOTAL		Pct of Capacity	
				October	Year to Date	October	Year to Date	October	Year to Date	October	To Date
Eastern.....	12	13,870,880	1,188,951	11,397,911	23,404	295,791	1,212,355	11,663,702	102.9	101.0	
Pitts.-Yngstn.....	17	27,070,520	2,353,893	22,089,135	29,769	256,952	2,383,462	22,346,067	103.6	99.1	
Cleva.-Detroit.....	6	7,110,600	580,160	5,737,181			590,160	5,737,181	97.7	96.9	
Chicago.....	7	15,684,040	1,289,997	12,553,274		5,094	1,299,997	12,558,968	96.8	96.1	
Southern.....	9	5,310,740	426,073	4,398,016	11,952	83,818	438,025	4,481,834	97.1	101.3	
Western.....	4	3,425,200	283,177	2,556,296			283,177	2,556,296	97.3	99.6	
Total.....	38	72,471,790	6,132,051	58,731,813	65,125	612,255	6,197,176	59,344,068	100.6	99.3	

DISTRICTS	STEEL —NET TONS	Number of Companies	Annual Capacity	TOTAL STEEL (Incl. Alloy Steel, Carbon Ingots)		Pct of Capacity		ALLOY STEEL		CARBON INGOTS	
				October	Year to Date	October	To Date	October	Year to Date	October	Year to Date
Eastern.....	25	20,823,230	1,821,378	17,192,181	102.9	99.1	145,699	1,392,783	388,377	3,638,774	
Pitts.-Yngstn.....	34	41,411,870	3,569,358	34,198,044	101.4	99.1	496,541	4,732,470	412,399	3,976,717	
Cleva.-Detroit.....	8	9,601,940	858,095	8,106,548	105.2	101.4	70,060	689,334	98,248	1,004,238	
Chicago.....	15	21,522,750	1,873,175	16,618,943	102.4	103.9	131,648	1,416,788	277,655	2,702,379	
Southern.....	9	4,913,340	441,863	4,252,158	105.6	103.9	5,260	49,949	1,662	34,173	
Western.....	11	5,956,520	552,265	5,085,899	109.1	102.5	15,874	114,361	30,073	324,607	
Total.....	81	104,229,650	9,116,134	87,455,773	102.9	100.7	967,082	9,395,585	1,206,411	11,680,888	

* Revised.

LEAD: Cladding Adds New Uses

Lead-clad copper and steel mass-produced by new processes . . . Cut waste from sulfuric acid corrosion . . . Bonding done automatically . . . See wide use in industry, nuclear work.

Mass production of two clad metals to reduce the waste caused by the corrosive action of sulfuric acid was announced by Knapp Mills Inc. last week.

First of the new metals is Ferrolum, a chemically bonded combination of lead and steel. Ferrolum combines lead's high resistance to sulfuric acid with steel's strength.

Instead of hand bonding, customary method of making lead-clad steel, Ferrolum is produced by automatic cladding machines. Process is covered by patents of American Viscose Corp., which has licensed its commercial development to Knapp.

Clad Copper—Cupralum, the second metal, is a bond of lead and copper. It adds copper's high

electrical conductivity and heat transfer value to lead's acid resistance. Mass production resulted from Knapp's development of a new process by which lead and copper are drawn simultaneously to form a chemical bond.

Uses for the new materials are anticipated wherever sulfuric creates a corrosion problem. The nuclear industries also promise a wide range of applications, thanks to lead's qualities as a shield against radioactivity.

Other Uses—Lead-clad copper coils are now being used in the heating and cooling of sulfuric acid. A special advantage is that freon may be used for cooling in Cupralum coils.

Another promising field for the lead-copper bond is the electroplating industry. Acid resistance of the lead makes possible increases up to 1000 pct over the present charge on the anode. Heavier current loads would increase both the speed of the process and the amount of metal deposited.

Radiation Job Hazards Studied

New lines of attack are being developed in connection with a problem arising from the atomic age—protection of American uranium mine and mill workers from radioactive dust. That radon is present in most of these facilities in sufficient quantity to demand adequate control measures has now been determined as a result of a Public Health Service study in close cooperation with the Atomic Energy Commission.

This study began in 1950. But progress has been slow due to lack of "complete information on the control of radon." At least two conferences have been held—one with state and other official agen-

cies and the other with officials from the mine and other affected industry. More meetings are scheduled shortly to discuss new findings and improvements in methods of estimating and controlling the hazard.

Aluminum:

GE solves joining problems to perfect new lamp bulb bases.

General Electric is now using aluminum instead of brass for a large part of its output of electric light bulb bases. In addition to conserving scarcer brass, the company is now in position to use whichever metal is in least critical supply at any given time. The new use for aluminum has been approved by National Production Authority.

The development is expected to prove of broad interest to other manufacturers who have similar problems in aluminum fabrication and joining. Some of these problems have apparently been solved. An alloy has been developed which will withstand the high temperatures of lamp assembling machines. A solder and a flux suitable for high speed automatic soldering operation have also been perfected. This soldering operation involves attaching to the shell a base wire leading to the filament.

Much Testing—In addition, it was necessary to make exhaustive tests for electrolytic corrosion in various atmospheres, contact resistance, etc.

GE says the new lamps are identical in life, efficiency, and cost to brass-based bulbs. The aluminum bases are two and one half times better conductors than brass, and have the advantage of being resistant to tarnishing.

Swedes Store Oil in Old Mines

Fuel oil and gasoline are now being stored underground in old mines by the Swedish State Power Board. Technique is similar to that used for storage of natural gas in this country. (THE IRON AGE, Nov. 1, 1951, p. 76).



LEAD CLAD: First automatic lead bonding machine is demonstrated by Victor Knapp, vice-president, Knapp Mills, Inc. Machine is lead cladding the inside of a steel drum which will hold sulfuric acid.

ORE: Humboldt Process Step by Step

Ford and Cleveland-Cliffs will make first try at producing iron concentrates by flotation . . . Low-grade ore is non-magnetic . . . Describe process step by step—By W. G. Patton.

The beneficiation of a low-grade, non-magnetic iron-bearing ore of the specular hematitic variety under a joint agreement by Ford Motor Co. and Cleveland-Cliffs Iron Co. at Humboldt, Mich., will be the first attempt to produce iron concentrates on a commercial scale by the flotation method.

The extent to which the new method can be employed in other Michigan and Minnesota low grade ores will depend, to a large extent, on the degree to which the favorable circumstances can be duplicated which led to the agreement by Ford and Cleveland-Cliffs to invest \$10 million in the project. (THE IRON AGE, Nov. 29, 1951, p. 37.)

Favorable Factors—Several factors have contributed to the decision by Ford and Cleveland-Cliffs to go ahead with the plan: (1) Open pit mining will be used, (2) the crude iron ore lends itself to high recovery by the flotation process whereas other ores might not be workable by this method, (3) pilot plant experience indicates that enrichment of the ore by this process will pay most of the cost of flotation.

(4) The large ore bed is located on an existing railroad only 25 miles from lake shipping, (5) no dock construction will be required, (6) as soon as the equipment is in operation concentrates can be shipped by lake freighter using regular iron ore as a carrier for the concentrates, (7) the new Ford sintering plant at River Rouge will utilize the concentrates to enrich the sinter feed.

Second Unit—By 1955 it is anticipated that approximately 20 pct of Ford's iron ore requirements will come from the Hum-

boldt range. Production at a rate of 200,000 tons per year is anticipated by 1953. Installation of a second crushing, pulverizing and flotation unit will double the output by 1955. Experience at the pilot plant shows 1.65 Fe content in the tailings.

The beneficiation method to be used at Humboldt is basically similar to the flotation method used in the recovery of copper. Difference is that a crude of 32 pct iron content will be treated at Humboldt by flotation as compared with treatment of 5 pct or less in many copper mining operations.

As planned at the present time, raw ore taken from the pit will be run through primary, secondary and tertiary crushers. A 3000-ton bin will store the crushed material before it goes to rod and bar mills.

In the next step the ore is carried into classifiers for desliming and laundering. The following operation takes the ore through Dutch cyclone separators and densifiers.

The present plan calls for the use of three flotation cells in tandem. Agitation, as in the case of copper processing, will be provided by compressed air. In the process to be used, the ore particles cling to froth bubbles and the gangue sinks to the bottom of the sluice.

Moisture Reduced—Further grinding may be done in a ball mill. After a thickener is added, the residue will be filtered. Moisture content is then reduced to less than 10 pct and the concentrated material will be ready for shipping.

Currently, normal iron ore mined averages about 48 pct iron content. Jasper ore runs only

Edison in Ore Research

Thomas Alva Edison was once in the iron ore research business, according to an 1897 issue of THE IRON AGE. Mr. Edison had spent considerable time and money on lab work to discover a process separating ores at Humboldt on the Marquette Range, site of Ford and Cleveland-Cliffs operations.

A fire disaster put him out of business at Humboldt and Edison carried his experiments to the safety of Long Island. He built a laboratory there and was all set—when a tidal wave washed out his interests.

about 32 pct iron. However, after enrichment, the Ford ores will have 62 pct iron content.

At the dock, the Ford ore concentrate will be mixed with a suitable amount of ore taken from other northern Michigan mines. The natural ore serves, therefore, as a carrier. At Ford's Rouge plant, the ore will be screened to separate the fines, including the beneficiated ores produced at Humboldt. This material will then be employed to enrich the flue dust caught in the Ford blast furnaces.

Sintering Plant—Eventually, a mix of 40 pct concentrates, 40 pct fine ores and 15 pct flue dust, and 5 pct mill scale will be used in the new 1500-ton sintering plant now under construction at the Rouge.

Enrichment of the sintered material will make possible faster and greater production of iron per hour in the Ford blast furnaces. Another advantage will be a substantial reduction in scrap requirements for the Ford stacks.

Ultimately, Ford may form part or all of the beneficiated ores taken from its northern Michigan properties into pellets. A pelletizing process is now under investigation but the final decision will not be made until the company learns more about using unpelletized material.

SCRAP: Press For Stored Ships

Navy again asked to release 28 mothballed cargo ships . . . Claims we would need them in case of war . . . Many already cut up . . . Salvage trade cool to sunken ships—By T. Metaxas.

As scrap iron and steel stockpiles were razed almost flat by unrelentingly high ingot production rates, the yearning with which some mill scrap consumers regarded the Maritime Administration's mothballed fleet of freighters changed to fuming. Standard argument ran: While scrap shortages threatened to trim steel output, this clean, heavy marine scrap was parked in rivers—useless.

Some Washington officials believe it is time for consumers to lower their accusing fingers—or at least point in another direction. The Maritime Administration has submitted for the second time a list of 28 ships which it considers salvageable. The Navy must approve the list in part or whole before a rivet on the mothballed ships can be sprung.

High Pressure—Although the Navy said "no" on the first offering of the list, pressure of the scrap shortage and high Washington brass will this time encourage release of a substantial number of the vessels. The list includes old hospital, barrack, and cargo ships—thousands of tons of needed scrap for the steel industry.

The Navy maintains that all the ships that could be salvaged without threatening security of the country have gone to scrap already.

About 750 Maritime Administration ships have been navigated into scrap channels after World War II. About 2.5 million tons of excellent ferrous scrap, thousands of tons of nonferrous scrap have been generated. In 1947 alone more than 1 million tons of steel scrap were released.

Might Need Them—Scrap men can immediately counter that this

is a negligible percentage of the tonnage still floating in the backwaters. The Navy believes that our stockpile of ships is nevertheless inadequate to meet sudden demands of a total war. Anything that can float will be needed. Ships that are scrapped now may be needed later—and it may be too late then to build them.

In the past few months four vessels have been disposed of to the scrap trade. This week bids

For more news on scrap see Scrap Summary, p. 230.

will be opened on two more ships, *American Seaman* and *Pacific Explorer*.

The Maritime Administration has asked salvage bids on several ships sunk off coast or beached during World War II. Enthusiasm of the salvage industry towards these ships has not been keen. The scoreboard shows no results. Salvage of sunken ships for scrap and cargo is the most hazardous



"The boss says we gotta keep the scrap moving this winter."

recovery work. Incentive to enter into these projects may also be scuttled by strict price ceilings on scrap. The Maritime Administration has received some bids requesting government subsidy.

Scrap Teams—Last week the Navy reported that its inspection team had returned from the Alaska-Aleutian area with news of 31,000 tons of scrap which could be returned to the steel industry. Beached and sunken ships, net and boom material, and several hundred miles of communications wire are included.

A 4-man scrap team recently returned from a tour of Korea, Japan, Formosa, Okinawa, India, and Thailand. It reported that 35,000 tons of shipping had been sunk off Formosa and that island was preparing 50,000 tons of scrap for shipment to U. S. mills.

The mission told Defense Production Administration that the Korean battle area can yield 100,000 tons of scrap. Thailand could generate as much as 100,000 tons and "very large tonnages" are strewn about India.

Foreign Materials Search Aided

Search for new overseas sources for strategic materials will be pressed during coming months with aid of Marshall Plan funds. Direct commitments now total more than \$25,000,000. An equal amount in counterpart funds has been set aside for this purpose. These figures do not include any money from the "technical assistance" allotments.

By far the largest amounts have gone into exploration and development of bauxite sources. But search for critical lead and zinc has been running a close second. More recently, money has been allotted to aerial surveys to help decide whether ground exploration in specific areas is justified.

There has been no fanfare. But these projects are now beginning to pay off in shipments of industrial diamonds, fluorspar, and other needed materials.

MATERIALS: Figure In Wage Talks

Steel firms to cite cumulative non-labor cost increases . . . Costs have accumulated more than a year . . . Freight and many of steel industry raw materials listed—By J. B. Delaney.

Non-labor cost increases in steel production during the last year, or longer, will figure prominently in steel labor contract negotiations. Steel producers will use these increases to argue against a wage advance unless they receive permission to increase prices.

Last year, when steelworkers received an increase averaging 16¢ an hr, steel prices went up an average of 5½ pct. Producers said this reflected only higher employment costs, exclusive of other cost advances during 1950.

Wage-Price Ratio—Benjamin F. Fairless, president of U. S. Steel Corp., said recently that for each penny steel wages are advanced, his company must add \$10 million to the price of its products. He said advances in price of goods and services bought by his company as the result of wage increases, account for another \$10 million. This would not include price increases prior to the wage boost.

Many of the things steel companies buy have gone up this year. In few of these cases have they been able to pass along the increases to their customers.

Freight Rises—Freight increases alone added between 65¢ and 85¢ to the cost of producing a ton of finished steel. The railroads would like to hike freight charges even further. Barge rates have also gone up. Truckers are champing at the bit for higher rates.

Refractories used in melting and heating furnaces have advanced. Fluorspar went up from \$40 to \$43 per ton Jan. 15.

Materials Increases—Effective last Jan. 1, were these price increases: cobalt, from \$1.80 to

\$2.10 per lb., ferrotitanium from \$1.40 to \$1.50 per lb., ferromolybdenum from \$1.22 to \$1.32 per lb., ferrotungsten from \$2.75 to \$3.25 per lb., ferrochromium, high C, from 20.5¢ to 21.75¢ per lb., other ferrochromium products up correspondingly from a range of 27.5¢-31.85¢ to 29.25¢-33.6¢ per lb., ferrosilicon from 13.5¢ to 14.3¢ per lb., ferrocolumbium from \$3.50 to \$4.90 per lb.

Last May, ferrotungsten went up again, from \$3.25 to \$5.00 per lb. On June 1, nickel advanced from 50.0¢ to 56.5¢ per lb. In October, cobalt took another spurt, from \$2.10 to \$2.40 per lb.

Slow Motion—Contract negotiations are moving ahead about as expected. U. S. Steel Corp. and the union held their first meeting Nov. 27, and at week's end the union was still presenting its list of 22 demands. Neither side was saying anything of importance about progress. Other steel producers



SALVAGE: Jib crane lowers metal chips into centrifuge to recover lubricants. Chips are from screw machines at Westinghouse Electric Corp.'s Buffalo plant.

met with the union later in the week.

The time consumed by the union in presenting its demands lessened chances of an agreement before expiration of all but a few contracts Dec. 31. The government will step in when it becomes obvious that the contracts will expire without agreement.

Extend Contract—At a brief meeting, the union and Aluminum Co. of America agreed to extend their contract from its expiration date of Nov. 30 to Dec. 31. Last year, Alcoa strengthened the union's case in steel by granting a voluntary pay boost of 10 pct.

Gives Cost-of-Living Pay Rise

International Harvester Co. has announced increased wages and salaries of more than 70,000 non-managerial employees. The increase will be 1¢ an hr effective on or after Dec. 1, 1951.

The increase, which will cost the company approximately \$1.6 million, will be made to adjust employees' wages to the increased cost of living. It will be applied to union employees having cost-of-living clauses in their contracts and office and other employees not represented by the unions, but covered by the company's cost-of-living pay policy. This latest increase raises the average straight time earnings of production and maintenance employees at Harvester's plants to \$1.98 an hr.

Becker Made New NLRB Exec. Sec

Louis R. Becker has been appointed executive secretary of the National Labor Relations Board. He succeeds Frank M. Kleiler, who resigned to become disputes director for the Wage Stabilization Board.

Equal Pay for Equal Work Policy

Wage Stabilization Board says it intends to follow an "equal pay for equal work" policy as a means of promoting maximum defense production and sound working relations.

PRICES: No Warehouse Rollback

**Price ceiling for steel middlemen will hit gray market . . .
But regular warehouse prices won't be lower . . . Some may
increase . . . Action aimed at curbstone brokers' daisy chains.**

Price ceilings for the steel middleman do not mean that regular warehouse prices are due for a rollback. In fact prices of some steel products sold through established warehouses are likely to be increased slightly when Ceiling Price Regulation 98 becomes effective Dec. 16.

This is because warehouses, in most cases, will be permitted their regular percentage markups, plus some cost increases, such as the two latest freight increases which they have been absorbing under the general price freeze.

Curb Brokers—The price order will curb the activities of a few steel middlemen and curbstone brokers who have been forging "daisy chains" across the country to conceal their fantastic prices. Until now, their activity, no matter how unethical, was not considered illegal.

Many weeks in preparation at Office of Price Stabilization, CPR 98 affects warehouse and distribution personnel, wholesalers, jobbers, distributors, merchants, brokers, and other intermediaries between the producer and consumer. Direct sales from mills are not covered by this order.

Mill Price Plus—In most cases, CPR 98 will apply as of Dec. 16. Certain warehouse resellers, however, will not be covered by the regulation until Dec. 31.

The order establishes resellers' ceilings that include current producing mill prices, plus pre-Korean markups at normal levels of warehouse distribution. Markups are not the same on all products. But prices may drop below those permitted under the General Ceiling Price Regulation.

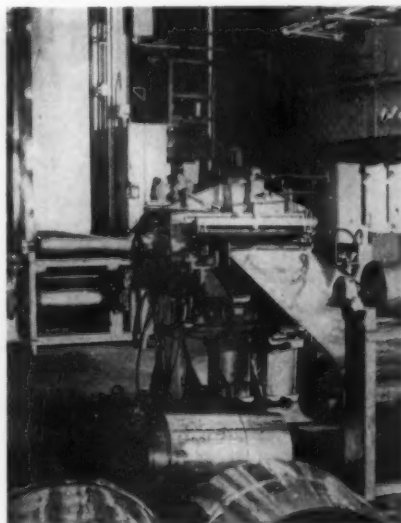
Products Covered—In the event a warehouse asks a mill to ship

steel direct to the warehouse's customer, the customary practice of charging regular mill price will be followed.

In addition to merchant wire, roofing, siding, industrial products covered by the order include structural shapes, universal and sheared plates, galvanized bars, concrete reinforcing bars, cold finished bars, hot and cold-rolled sheets and strip, black plate, welded and seamless tubing, and tool steel.

Quota Stopped for NPA Violation

Alside, Inc., of Akron, and subsidiaries, have been suspended from all operations for a period of 6 months by the National Production Authority following action taken by Harrison W. Ewing, NPA hearing commissioner in Cleveland, last week. Order suspends respondents from allotment and priority assistance and from use of aluminum for 6 months because



HEAT TREATING: This continuous annealing and pickling machine at Chase Brass & Copper Co. processes 140,000 lb of brass daily. A flow of 25-in. sheet metal passes through the furnace which applies identical heat treatment to each part of the sheet.

of alleged NPA control violations.

This is most drastic action taken by NPA compliance and enforcement since World War II. Action constitutes complete shutdown of plant, affecting some 80 employees.

Fluorspar Diverted to Industry

Acid grade fluorspar, intended for stockpiling, will continue to be diverted to industrial use at least through first quarter 1952.

This is in order to assure sufficient supplies for refining hydrofluoric acid for steel pickling, the atomic energy and Chemical Corps programs, and aviation gasoline.

In addition, at least three orders—including limitation of acid grade fluorspar inventories to a 45-day level—are pending in NPA.

Production in 1952 is now seen as about 95,000,000 lb against a probable requirement of 105,000,000 lb for essential purposes.

Ruling on Commissions

Compensation increases allowable under the new General Salary Stabilization Reg. 5 are confined chiefly to drawing accounts and commissions of outside sales employees.

Although adjustments are allowed under the order, Reg. 5 permits no increase in commission rates. Another limitation excludes driver salesmen from coverage by the regulation.

Reg. 5 rules an employee paid only by commissions may get a drawing account or salary against commissions up to, but not exceeding, 77 pct of his total earnings in 1950, or the same percentage of his average total earnings in the 3 best years from 1946 to 1950.

Industry Controls This Week:

OPS Orders

GOR 20—Sets new pricing formula for small business.

CPR 22, Supplementary Reg. 19—Raises cast-iron radiator prices.

CPR 98—Establishes steel resellers' ceiling prices, effective Dec. 16.

GOR 20 Sets New Pricing Formula

Costs of many defense contracts may be boosted through use of a new, simplified pricing formula designed to assist small manufacturers and industrial service companies in determining their ceiling prices.

Established as General Overriding Reg. 20, the formula may be available to as many as 150,000 manufacturers, many of them handling military subcontracts for larger firms. Only companies showing net sales of not more than \$250,000 in their last fiscal year, ending not later than July 31, 1951, may use the formula.

How to Use—Those utilizing GOR 20 will compare net sales and operating costs for the first 6 months of 1950 with corresponding figures for the first half of this year to find the percentage of increase in production costs. The overall percentage increase, applied to the price of the item or service sold, will determine the proper ceiling price.

GOR 20 is expected to make computations easier for companies wishing to make Capehart Amendment adjustments in ceilings. Some rollbacks are possible in use of this order, OPS says.

Consumers are not affected directly by GOR 20.

Pipelines Given Steel Priority

Priorities in obtaining steel line pipe have been granted by the government to three major natural gas pipeline projects in eastern and southeastern states.

Completion of the lines will require a total of 915,460 tons of pipe. In the first quarter of 1952, 143,150 tons have been allocated to the projects.

Their locations and individual allotments are:

An extension of the Tennessee Gas Transmission Corp.'s Gulf Coast-Buffalo line to the N. Y.-Mass. border; 41,000 tons.

New lines of the United Gas Pipeline Co., running from the Gulf Coast to Kosciusko, Miss.,



BRANDT

COMPLETE PRODUCTION FACILITIES SPEED-UP DEFENSE CONTRACT WORK*

Brandt's production lines are geared for mass production of component parts for prime and sub-contract defense work.

Brandt's proximity to steel mills and rail and water transportation assures on-time delivery.

**Regardless of stepped-up defense production, our industrial accounts still receive prime consideration.*

WRITE TODAY

for your copy of this handy file of Brandt mass-production facilities for all kinds of metals.

**METAL STAMPINGS
HEAVY WELDMENTS
PRESSED STEEL
SHAPES**



CHARLES T. BRANDT, Inc.
1700 Ridgely St.
BALTIMORE 30, MD.

Make Production lines

Logan Upenders, Side-Tilters, and specially-fitted Apron Conveyors combine with Trough Rolls and Level Rolls to make an efficient system for the handling of brass coils to and from mills.

Productive lines



"Increased productivity" is the keynote of the day. Conveyors can help toward this end in more ways than one. Logan Conveyors (a) keep equipment operating at capacity (b) deliver material to operators at convenient working height (c) save time and effort between processes. In performing the above services Logan Conveyors have "a good name" among the nation's foremost mills and metal working enterprises. Perhaps your plant, too, can benefit from Logan's two generations of conveyor engineering and manufacturing experience. If you have a handling problem, write today for more specific information or for the nearest Logan engineer to call.



Logan Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE, KY.

Controls

and Monroe, La.; 44,150 tons. An 826-mile line of Texas Eastern Transmission Corp. from Kosciusko to Connellsville, Pa.; 58,000 tons. When finished, this line will supply the Appalachian region and, later, New England.

Wilson:

Warns of "guns and margarine," promises "production miracles."

Military production amounting to about \$4,000,000,000 per month in 1953 has been assured once more by Defense Mobilizer Charles E. Wilson, who said there may be a swing to "guns and margarine" as the country pursues its rearmament course.

Nonetheless, Wilson told nearly 300 European economists touring the U. S., there is no change in the government's decision to keep the civilian economy "at a wholesome, if reduced rate." He added that "the pinch on our civilian industry will become more obvious" in the coming months.

He's Satisfied—Addressing businessmen brought to this country under Economic Cooperation Administration sponsorship, Wilson did not refer directly to recent Senate Preparedness Subcommittee charges that arms deliveries are lagging "dangerously." He conceded that "certain essential items" are not being turned out on schedule, but insisted the foundations of rearmament are well established.

The mobilization chief attributed much of the lag in munitions deliveries to design changes.

Miracles—Arms are going to the military at the rate of \$2,000,000,000 per month, Wilson said. He assured the visitors they would see a repetition of the "production miracles" achieved by the U. S. during World War II.

Cast-Iron Radiator Price Raised

Manufacturers' prices for cast-iron radiators may be raised 2½ pct above General Ceiling Price Reg. figures, OPS has ruled.

Defense Contracts

Contracts Reported Last Week

Including description, quantity, dollar value, contractor and address.

Control, C-485/GRC, exceeds \$250,000, Garod Radio Corp., Brooklyn.

Radio receiver, exceeds \$250,000, Motorola, Inc., Chicago.

Mounting, exceeds \$250,000, Parkchester Machine Corp., New York.

Trucks, stake and platform, exceeds \$250,000, GMC (Chevrolet Mtr. Div.), Detroit.

Trucks, pickup, exceeds \$250,000, GMC (Chevrolet Mtr. Div.), Detroit.

Replenishment of tank and combat vehicle parts, exceeds \$250,000, Federal Industries Inc., Detroit.

Replenishment of other motor vehicle parts, exceeds \$250,000, Cleveland Graphite Bronze Co., Cleveland.

Impact actuated switches, 5000, \$186,200, The Vendo Corp., Kansas City.

Bomb shackle hooks, 5000, \$23,750, Martin-Perry Corp., Toledo.

P-3 bomb dollies, 76 ea, exceeds \$250,000, Fruehauf Trailer Co., Detroit.

Machinery and equip., exceeds \$250,000, General Motors Corp., Detroit.

Machinery and equip., exceeds \$250,000, Union Carbide & Carbon, Kokomo, Ind.

Machinery and equip., exceeds \$250,000, Telechron Inc., Ashland, Mass.

Machinery, equip. and removable steel partitions, exceeds \$250,000, General Motors Corp., Plymouth, Mich.

Machinery and equip., \$200,000, Stainless Ware Co. of America, Walled Lake, Mich.

Machinery and equip., General Motors Corp., Detroit.

Wheel and brake assy., exceeds \$250,000, Goodyear Tire & Rubber, Akron, Ohio.

Fuel injection systems, exceeds \$250,000, Bendix Products, Bendix Aviation Corp., South Bend, Ind.

Wheel and brake assays., exceeds \$250,000, Bendix Products, Bendix Aviation Corp., South Bend, Ind.

Components of type E-4 autopilot, exceeds \$250,000, Sperry Gyroscope Co., Sperry Corp., Great Neck, L. I., N. Y.

Assys., \$85,316, North American Aviation, Los Angeles.

Aviation armament spares, exceeds \$250,000, The W. L. Maxson Corp., Maxson Engineering Div., New York.

Maintenance parts, 32 ea, \$214,658, United Aircraft Corp., Dallas.

Maintenance parts, 1060 ea, \$74,062, Chance Vought Aircraft, United Aircraft Corp., Dallas.

Aviation armament, exceeds \$250,000, United Aircraft Corp., Chance Vought Aircraft Div., Dallas.

Container, metal for 280000 ea, \$89,815, American Can Co., Philadelphia.

Gages, var., \$31,394, Phila. Form Grinding Co., Philadelphia.

Elevator machinery, exceeds \$250,000, Westinghouse Electric Corp., New York.

Dishwashing machines, 50, \$109,713, Universal Dishwashing Machinery Co., Nutley, N. J.

Repair parts for diesel engines, exceeds \$250,000, Sterling Engine Co., Buffalo, N. Y.

Electric motors & repair parts, 13212, \$88,897, The Leeco-Neville Co., Cleveland.

Repair parts for deck equip., 2030, \$33,098, Western Gear Works, Seattle.

Spare parts, job, exceeds \$250,000, The Ideal Electric & Mfg. Co., Mansfield, O.

Spare parts, job, \$143,075, Marathon Electric Mfg. Corp., Wausau, Wis.

Condensing unit equip. for air conditioning, 12, \$196,886, York Corp., Washington.

Power supply, 500, \$245,780, J. H. Keeney & Co., Chicago.

Gasoline meters, 120, \$105,000, Granberg Corp., Oakland.

A
Quality
Product

The ABC MST



A ALWAYS MAKES POSSIBLE
B BETTER PRODUCTS
C AT LOWER COST

Michigan Electric Resistance WELDED STEEL TUBING

ROUND

3/8" to 4" O. D. 9 to 22 gauge

SQUARE-RECTANGULAR

1/2" to 2" 20 gauge, 1" to 2 3/4",
14, 16, 18 gauge

Carbon 1010 to 1025

Serving our COUNTRY Serving our CUSTOMERS

We at Michigan are proud of our production record during World War II, when we manufactured many thousands of tubular products for the armed forces. We supplied electric resistance welded steel tubing both in straight lengths and fabricated into numerous intricate parts for many different uses, in vehicles, airplanes, bombs, etc.

Once again Michigan is prepared to serve the defense needs of our country with tubing for any application, in addition to meeting the requirements of customers for consumer products.

Whether for defense purposes or for products to maintain and improve our American living standards, Michigan engineers will be pleased to consult with you on tubing for better products at lower production costs.

Michigan Tubing

has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.



Consult us for engineering and technical help in the selection of tubing best suited to your needs.

Michigan

RESISTANCE WELDED STEEL TUBING

STEEL TUBE PRODUCTS CO.

More Than 30 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN

FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Globe Supply Co., Denver, Colorado—W. A. McMichael Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.



no worry and fear... no costly down time here

Management and workers alike know their plant is safeguarded from fire. No chance of a short circuit, a stray spark, a forgotten cigarette or spontaneous combustion starting a raging fire that could cut into vital production time, endanger the lives of employees or damage hard-to-get equipment, thanks to efficient, quick-acting C-O-TWO Fire Protection Equipment.

You too, can have this same secure feeling . . . this same positive protection from costly fires by installing complete, approved C-O-TWO Fire Protection Equipment. For example, the new C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing Systems keynote flexibility to meet your particular fire protection needs. Flammable liquids, electrical equipment, storage and manufacturing processes can all be made firesafe from a single low pressure carbon dioxide storage tank . . . capacities range from one to

fifty tons of fire-killing carbon dioxide. If fire should strike . . . fast, clean, non-damaging, non-conducting carbon dioxide extinguishes the blaze in seconds . . . no water damage, no after fire mess.

Further, when a C-O-TWO Smoke or Heat Fire Detecting System is used in combination with a C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System, the first trace of smoke or spark of fire in a protected area immediately sounds an alarm . . . then the fire quenching carbon dioxide is readily released into the threatened area.

So, whatever your fire protection problem, let an expert C-O-TWO Fire Protection Engineer help you in planning complete and up-to-date fire protection facilities now. Write us today . . . tell us about your particular fire hazards. Our experience is at your disposal . . . no obligation of course.



C-O-TWO FIRE EQUIPMENT COMPANY

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

Affiliated with Pyrene Manufacturing Company

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeeze-Grip Carbon Dioxide Type Fire Extinguishers • Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

—Defense Contracts—

Hammer, gasoline driven, 66 ea. \$184,000, Nordberg Mfg. Co., Milwaukee.

Spare parts for tractors, var., \$128,500, Caterpillar Tractor Co., Peoria, Ill.

Tractor, crane, 10 ea. \$89,000, Hughes Keenan Co., Delaware, Ohio.

Spare parts, var., \$80,000, Continental Motors Corp., Muskegon, Michigan.

Servo motors, 5000, \$213,850, The A. C. Gilbert Co., Inc., New Haven, Conn.

Sleeves for T227 fuses, exceeds \$250,000, Rite Products Corp., Hackensack, N. J.

Steel cartridge cases, exceeds \$160,000, Rheem Mfg. Co., Washington.

Typewriter, converters, printers, exceeds \$250,000, Radio Corp. of America, Camden, N. J.

Grenade, rifle, exceeds \$250,000, Carry Me Fall Co., Philadelphia.

Fuze, base, detonating, exceeds \$250,000, Deerfield Mfg. Co., Mason, Ohio.

Booster, exceeds \$250,000, The Schaeble Co., Cincinnati.

Vertical boring and turning mills, \$1, exceeds \$250,000, American Steel Foundries, Cincinnati.

Support assy., 965 ea., exceeds \$250,000, Parish Pressed Steel Co., Reading, Pa.

Range finders, exceeds \$250,000, Northrup Aircraft Inc., Hawthorne, Cal.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal, and opening date. (Invitations for Bids numbers are followed by "B," requests for proposals or quotations by "Q").

Navy Purchasing Office, Washington, D. C.
Gages, feeler, 3350, 1895Q, Dec. 18.
Indicator, exhaust temperature, 390, 5599AB, Dec. 21.

Gear, capacity, 200, 5625B, Dec. 27.
Machines, sheet metal working, 113, 5049B, Dec. 20.

Wrenches, box, 80200, 5569B, Dec. 26.
Wrenches, track, 1672, 1937Q, Dec. 19.

Jacks, automobile and motor truck, 3363B, 5592B, Dec. 10.

Quartermaster Depot, Chicago
Intrenching tool combination, 500000 ea., 55-66B, Dec. 20.

Ordnance Tank Automotive Center, Detroit
Shaft, final drive, 450, 52-557B, Jan. 2.

Cover, cable clip assy., 100, 52-259B, Dec. 21.
Socket, Azimuth indicator, 90000, 52-259B, Dec. 20.

Toe, 1600, 52-259B, Dec. 20.
Plug, connector, 400, 52-259B, Dec. 20.

Switch, 325, 52-259B, Dec. 20.
Light, instrument panel assy., 175, 52-239B, Dec. 20.

Cover, terminal box, 180, 52-259B, Dec. 20.
Sleeve, mounting, headlight, 91, 52-259B, Dec. 20.

Lamp, blackout, 150, 52-259B, Dec. 20.
Regulator, voltage, 200, 52-190B, Dec. 20.

Light assy., 4900, 52-190B, Dec. 20.
Bolt, hex hd., 229,300, 52-757B, Dec. 20.

Control, cross shaft, 20, 52-537B, Dec. 31.
Bolt, hex hd., 200,000, 52-757B, Dec. 20.

Bolt, sq. hd., 105,000, 52-757B, Dec. 20.
Tachometer, eng., 765, 52-793B, Dec. 20.

Mallory AF Specialized Depot, Memphis, Tenn.
Aircraft hardware, var., (40-604-52-38), Dec. 1.

Bushings, 2025 ea., (40-604-52-38), Dec. 1.
Caps, 40550 ea., (40-604-52-38B), Dec. 1.

Clamps, 1065 ea., (40-604-52-38B), Dec. 1.
Clips, 8300 ea., (40-604-52-38B), Dec. 1.

Cross, 50 ea., (40-604-52-38B), Dec. 1.
Elbow, 1275 ea., (40-604-52-38B), Dec. 1.

Fittings assy., 308 ea., (40-604-52-38B), Dec. 1.
Gasket, 650 ea., (40-604-52-38B), Dec. 1.

Grommet, 34600 ea., (40-604-52-38B), Dec. 1.
Hinge, 275 ea., (40-604-52-38B), Dec. 1.

Nuts, 5100 ea., (40-604-52-38B), Dec. 1.
Pins, 4800 ea., (40-604-52-38B), Dec. 1.

Terminals, 13075 ea., (40-604-52-38B), Dec. 1.
Turnbuckles, 670 ea., (40-604-52-38B), Dec. 1.

Nipple, 1470 ea., (40-604-52-38B), Dec. 1.
Watervliet Arsenal, Watervliet, N. Y.
Handle, breech operating, 400 ea., 52-37B, Dec. 13.

Corps of Engineers, U. S. Army, Chicago
shop, woodworking, motor, 7 ea., B-219Q,
lot. 30.
Columbus General Depot, Columbus, Ohio
Motors, engine hour, 1290 ea., 52-166B, Dec. 17.
Engine parts, materials handling equip., var.,
52-168B, Dec. 17.
Mechanism, elevating and traversing, 700 ea.,
11-470752-385B, Dec. 18.
Equalibrator assy., 800 ea., (11-070-391B), Dec.
18.
Pintle, 30000 ea., (11-070-422B), Dec. 18.

Group Advises on Navy Buying

First-class advice from a new industry group soon will be reflected in the Navy's requirements and purchasing operations and its inventory control and management activities.

Expert businessmen checking the Navy's activities in the requirements and supply field represent the communications, auto appliance, banking, chemical manufacturing, trucking, railroad, oil filter, and warehousing industries, among others.

Plans are for the group to be asked from time to time to troubleshoot specific problems, rather than to meet periodically for routine conferences.

Navy Contracting Guide Readied

Details on the techniques of helping the Navy Dept. Bureau of Yards and Docks put its money to work will be available to businessmen soon in a new government-prepared pamphlet.

Tentatively entitled *How To Do Business With The Bureau of Yards and Docks*, the guide is in draft form and may be amended somewhat before it is issued.

Contents are designed to assist potential prime contractors and subcontractors in securing defense orders, most of which are placed by procurement officers in the field.

Minneapolis Subcontractor Show

First Armed Forces Subcontractors' Exhibit scheduled for 1952 will be staged in the Minneapolis National Guard Armory, Jan. 8-10.

As in earlier exhibits in other cities, the Minneapolis show will permit manufacturers in the upper Midwest to examine items available for subcontracting. Prime contractors will have on hand engineering



... WHEREVER your plant is

CONTINENTAL

has a nearby warehouse
to give you
"RIGHT NOW" SERVICE

Serving your rubber requirements is an exclusive business—not just a sideline—at Continental's 16 Warehouses.

These Continental warehouses carry extensive stocks of industrial hose, boots and rubberized work clothing. They're located within convenient telephone and delivery range of most industrial centers. And they're staffed with people specially trained to cater to your rubber goods needs. You enlist the services of specialists in rubber when you call a Continental Warehouse.

SO—when you need hose, boots, or clothing—be sure to get acquainted with the Continental Warehouse nearest your plant. You'll like the service you get.



**CONTINENTAL
RUBBER WORKS**

ERIE 6 • PENNSYLVANIA

Industrial Hose



Rubberized Clothing



Rubber Boots



FREE Catalog

CONTINENTAL RUBBER WORKS
1983 Liberty Street, Erie 6, Pa.

Please send copy of Industrial Rubber Products Catalog.

NAME _____
COMPANY _____
ADDRESS _____
CITY AND STATE _____

*Foundry Men! How much
are STRAINER CORES costing you?
Figure it out for yourself—
right here?*

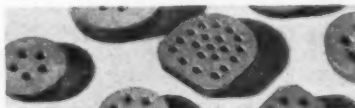
MATERIAL COST		COST SHEET	
Sand	Lb. @ _____		
Binder	Lb. @ _____		
Oil	Qt. @ _____		
Oil	Pt. @ _____		
BATCH MATERIAL COST _____			
÷ CORES PER BATCH _____			
MIXING ROOM OVERHEAD _____	MATERIAL COST PER CORE _____		
LABOR—CORE ROOM _____	% ON MATL. COST _____		
_____ PC. PER HR. @ _____			
OR			
_____ PC. RATE _____			
CORE ROOM OVERHEAD _____	% ON LABOR _____		
CORE OVEN SPACE _____			
COST PER UNIT (LB., TRAY, UNIT, ETC.) _____			
_____ (WGT., AREA, PC., ETC.) _____			
GROSS COST _____			

DON'T OVERLOOK INDIRECT FACTORS AND OTHER ITEMS OF OVERHEAD!

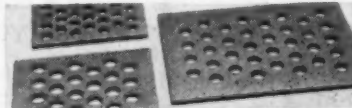
ALSiMAG[®]

It is possible that the immediate cost of ALSiMAG Ceramic Strainer Cores may be slightly more than your own,

but don't forget—you have absolute assurance in their strength, uniformity and dependability. They save your castings. They save you money!



ALSiMAG CERAMIC STRAINER CORES fit into the gate of your mold to strain the metal and regulate its flow. Many shapes and sizes to choose from.



ALSiMAG CUT-OFF CORES make a weak joint between casting and riser. Save cut-off time. Cameron Cores, Patent No. 2,313,517 sold to Meehanite Licensees only.

SAMPLES FREE ON REQUEST. Test ALSiMAG cores in your own foundry. Samples from sizes

in stock sent free on request. Test samples to your own specifications at reasonable cost.

AMERICAN LAVA CORPORATION

CHATTANOOGA 5, TENNESSEE

49TH YEAR OF CERAMIC LEADERSHIP

OFFICES: Philadelphia • St. Louis • Cambridge, Massachusetts • Chicago
Los Angeles • Newark, N. J.

Defense Contracts

and production representatives to discuss tooling, tolerances, and deliveries.

Local offices of the Commerce Dept. and the Defense Manpower Administration are being assisted by the governor's Small Business Committee and Minneapolis civic groups in presenting the display.

Sponsoring the show is the Armed Forces Regional Council.

Renegotiation Order Now Ready

While permanent contract renegotiation orders are being written, businessmen can be guided by an interim regulation recently prepared by the U. S. Renegotiation Board.

This temporary order cites major provisions of the pertinent law, lists federal departments whose contracts come under the law, and explains how to segregate income covered by renegotiation rules from that not covered.

The board's announced intention is to make compliance with the 1952 Renegotiation Act as simple as possible for contractors and subcontractors. Permanent regulations, the board says, will tell clearly what portion of income is subject to renegotiation.

GM Truck Orders at \$30,000,000

GMC Truck & Coach Div. of General Motors Corp. has accepted since June, 1950, approximately \$30 million of defense orders for regular commercial trucks, according to Roger M. Kyes, GM vice-president and general manager of the division.

Hundreds of subcontractors have shared in the work, which involves nearly 9000 truck units of all sizes and types. As a result, said Kyes, no new tooling equipment was needed.

Two Firms Get Army Tug Contracts

Two small business firms, Fellows and Stewart, Inc., Wilmington, Calif., and American Boiler Works, Erie, Pa., have signed Navy contracts to construct 10 steel harbor tugs, 65 ft long, for Army use. The Erie company will build 7 of the vessels.

Quonsets:

Industry finds new and varied uses for the latest version.

Industry is finding more uses for the versatile "Quonset." Latest models are full-size buildings capable of a wide range of uses.

Nearing completion at Milwaukee is a new 60,000 sq ft factory-warehouse for Nash-Kelvinator. Also at Milwaukee, A. O. Smith Corp., is adding 34,000 sq ft to its manufacturing space. Five new Quonset "long-span" buildings totaling 220,000 sq ft will be erected by Boeing Airplane Co. at Wichita, Kans. Quonsets made by Great Lakes Steel Corp.'s Stran-Steel Div., have these advantages:

(1) they are built of non-critical, cold rolled N-A-X high tensile steel, (2) group assemblies are made on the ground and hoisted into position, (3) straight side-walls are now provided and dimensions of the quonset have been increased so that bays 40 ft wide having a depth of 35 ft 6 in. are provided and (4) the building can be readily insulated and heated and light cranes may be used.

AIISI Specs—Designed to American Iron & Steel Institute specifications the structural members are light gage, cold-formed shapes. Exterior covering is galvanized corrugated steel sheets applied to Stran-Steel nailable members. All materials are factory fabricated, pre-punched where required for bolts and metal screws, packaged and shipped.

Both the dimensions of the interior bays and the clear height of the Quonset line of buildings have been increased.

Rib, purlins and bridging of the roof arches may all be assembled on the ground in 20-ft sections and lifted into place.

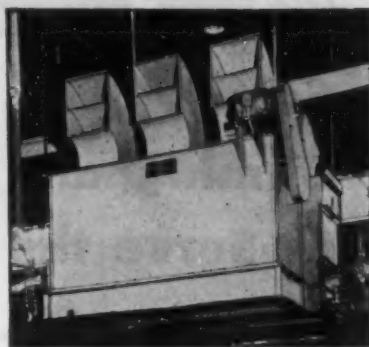
Stran-Steel executives emphasize that the size of the buildings, number of door and window openings, number of ventilators, freight charges and local labor rates have a substantial effect on the cost of the building.

Turn Page

New HIGH PRESSURE STEAM Fan Heater

Gives Savings You Never Had Before

The first heater to make High Pressure Steam really trouble-free and practical in plant heating. Every engineer should understand its original method; write for Niagara Bulletin and performance data.



HOW IT OPERATES:—A dual coil system makes use of all heat, both sensible and latent. High pressure steam enters the upper coil, shown on the diagram below. Its condensate drains into a trap. Then this high pressure condensate is released into the header of the lower coil. It instantly flashes into steam at vapor pressure.

Any high pressure condensate that remains liquid is carried to the vapor condensate return header by a drain tube that also gives off its heat into the air stream.

The vapor condenses in the lower coil. Its condensate is kept at a high level in the return leg by a wiper in the return header so that all its heat is made useful and it is sub-cooled by contact with the coldest air entering the heater. Vacuum condensate return to boiler is vapor free.

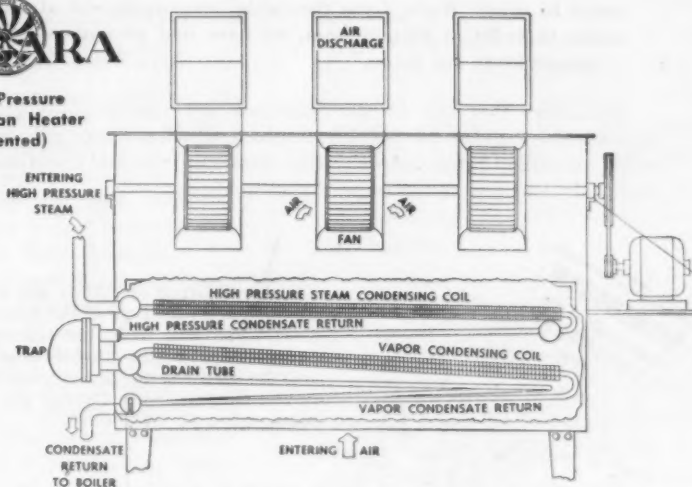
HOW IT SAVES IN COST:—Piping is much simpler and less costly than in low pressure systems. Much secondary piping, traps and big valves are not needed. Pipe sizes are smaller.

HOW IT SAVES IN OPERATION:—Waste is prevented. Every BTU goes where you want it. No dump traps or hot wells waste live steam.

HOW IT SAVES IN UPKEEP:—Condensate flow is even, vapor free, easily handled. No sudden surges of condensate in starting. No hammering, no hard wear and tear on system. Properly engineered for the job, final air temperatures are not excessive; heat easily directed where needed; no flashing of low pressure condensate. Heaters are self-draining on shut-down. Heaters are strongly built; all coils including the condensate drain tubes are hairpin bend, stress relieving. Use thru four heating seasons has proven these advantages in large scale plant heating.



High Pressure Steam Fan Heater (Patented)



NIAGARA BLOWER COMPANY

Dept. IA 405 LEXINGTON AVE., NEW YORK 17, N. Y.

Please send Bulletin 109 on the Niagara High Pressure Steam Fan Heater.

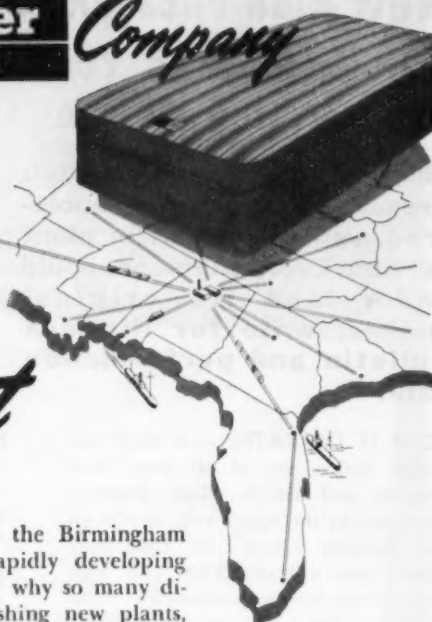
Name

Address

the Englander Company

SLEEP PRODUCTS

Selects Birmingham to Serve the Southeast



It's a short, fast haul from the Birmingham district to anywhere in the rapidly developing Southeast. This is reason No. 1 why so many diversified enterprises are establishing new plants, warehouses and sales offices at this crossroads of the Southeastern market.

Among recent new arrivals is the big plant of The Englander Company, Inc., manufacturers of a complete line of nationally advertised "sleep products," including the exclusive mattress of Good-year's Airfoam with Englander's Red-Line foundation, innerspring mattresses, box springs, dual sleeping equipment.

I. M. Pink, president of The Englander Company, gave these reasons for placing the new plant in Birmingham:

"The South was a growing market for our nationally advertised products. Our expansion program called for another factory located in a strategic spot to serve the largest trading area. After a thorough survey, Birmingham was selected as another link in our chain of bedding plants from coast to coast. Right from the initial announcement of our plans to build in Birmingham, we have had an enthusiastic response from our trade."

Industries that sell in the Southeast have tremendous growth opportunities today in the Birmingham district—nationally recognized for skilled labor, ample power, abundant raw and semifinished materials, and superior transportation facilities.



The Committee of 100 or any of the undersigned members of the Executive Committee will welcome the opportunity to give you confidential and specific data regarding the advantages of the Birmingham district for your plant, office or warehouse.

BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.
Executive Committee

Gordon Persons
Governor
State of Alabama
Bradford C. Calvert
President
Woodward Iron Co.
John S. Coleman
President
Birmingham Trust
National Bank

Donald Camar
Chairman of the Board
Avondale Mills
William P. Engel
President
Engel Companies
W. W. French, Jr.
President
Moore-Handley
Hardware Co.

Clarence B. Hanson, Jr.
Publisher
The Birmingham News
W. H. Hoover
President
Employers Insurance
Co. of Alabama
Mervyn H. Sterne
Sterne, Agee & Leach

Claude S. Lawson
President
Sloss-Sheffield
Steel & Iron Co.
Thomas W. Martin
Chairman of the Board
Alabama Power Co.
J. C. Parsons
President
First National Bank

O. W. Scharbacher
President
Lawman, Joseph &
Loeb
A. V. Wiebel
President
Tennessee Coal,
Iron & Railroad Co.

Construction

October Structural Bookings

October shipments of fabricated structural steel, compiled from reports received by the American Institute of Steel Construction, amounted to 241,411 tons, second only to the June figure of 257,066 tons which was the highest for the current year. Shipments for the first 10 months of 1951 totaled 2,281,374 tons, an increase of 22 pct over the corresponding period of 1950, when 1,869,194 tons were shipped.

Bookings for October, down slightly from September, were 182,894 tons, reflecting the effect of the short steel supply. The average monthly bookings for the first ten months of the year were 233,616 tons, practically the same as in the like period of 1950 when bookings were at the rate of 257,289 tons monthly.

The total backlog (tonnage available for future fabrication) at October 31st amounted to 2,640,851 tons. 1,062,788 tons of this were scheduled for fabrication within the four months following October.

Following is the complete tabulation of bookings and shipments:

Estimated Total Tonnage for the entire industry			
CONTRACTS CLOSED	1951	1950	Avg. 1947/1950
Total Tonnage			
January	361,373	147,275	161,979
February	256,746	146,696	152,186
March	297,517	236,111	221,387
April	337,026	191,183	177,853
May	268,166	237,476	178,566
June	207,966	233,000	196,733
July	223,540*	241,952	229,244
August	212,730*	326,586	212,389
September	188,187*	317,225	215,879
October	182,894	295,391	223,394
Totals	2,635,145	2,572,894	1,967,749

SHIPMENTS

January	214,000	154,733	166,919
February	193,638	149,824	161,179
March	237,087	185,222	191,257
April	234,095	187,801	192,843
May	234,486	194,762	198,459
June	257,066	202,379	192,851
July	204,380*	165,515	183,223
August	236,915*	218,435	204,444
September	228,296*	198,719	197,311
October	241,411	211,814	185,758
Totals	2,281,374	1,869,194	1,874,398

TONNAGE AVAILABLE FOR FABRICATION

	2,640,851	1,940,580	1,864,772
Within the next four months (To Feb. 28)	1,052,788	1,017,676	729,739
After the next four months (From Mar. 1)	1,588,063	922,904	634,983

*Revised

Fabricated steel awards this week include the following:

730 Tons, Boston, Mass., Central Administration building of New England Deaconess Hospital through Turner Construction Co., Boston, Mass., to American Bridge Co., Pittsburgh, Pa.

Fabricated steel inquiries this week include the following:

1144 Tons, Bucks County, Pa., construction of girder bridge, divided highway and pavement. Pennsylvania Dept. of Highways, Harrisburg, Pa. Bids to Dec. 14, 1951.

108 Tons, Schuylkill County, Pa., construction of divided highway and plate girder bridge, Pennsylvania Dept. of Highways, Harrisburg, Pa. Bids to Dec. 14, 1951.

Agencies Split on Anaconda Aluminum

Justice Dept. not keen on letting Anaconda Copper produce aluminum with Harvey . . . Fleischmann considers authorizing project anyway . . . DPA to enforce controls—By G. H. Baker.

A tug-of-war between government agencies continues over whether Anaconda Copper Co., teaming up with Harvey Machine Co., should be permitted to enter the aluminum production field.

Justice Dept. has informed Defense Production Administrator Manly Fleischmann that "officially" it has not arrived at any decision but that, despite not having complete information, "unofficially" it is not inclined to approve such a deal.

While Justice Dept. gave no direct reason for opposition, the Interior Dept., which often reflects Justice thinking, opposes release of power to Anaconda on "anti-monopoly" grounds.

Still Likes It — Nevertheless, Fleischmann says he definitely is still giving "serious consideration" to authorizing the project and ordering Interior to make power available from Hungry Horse Dam. It is estimated the project would add about 55,000 tons of aluminum ingots to national capacity.

The part of both Justice and Interior in the matter during the current emergency is largely advisory. This means that under the broad power of the Defense Production Act the DPA head could both authorize the project over Justice objections and direct that power be supplied—until his authority expires.

But it also means, trade sources say, that even with DPA authorization it is highly unlikely that Anaconda or any other industrial firm would go ahead with such a costly investment without more assurance than it has now that it would be immune from trust-busting action and would still get adequate power

after the Defense Production Act expires.

No Relation — Any lag in production for the defense program is not because of overly generous allocations of controlled materials for civilian purposes. So says Defense Production Administrator Manly Fleischmann in answer to congressional and other critics.

The controls administrator takes the stand that such criticism has been in generalities with no individual examples offered to support the criticism. If specific cases can be turned up, he declares, he will rectify the situation at once. There is no choice from his standpoint but that the military must get first call—if actually needed.

Although controlled materials

may be in tighter supply for the second quarter, Fleischmann at the moment sees no need "for ruthless cutting" of civilian allotments of steel and aluminum. However, allocations of other materials for civilian production may have to be trimmed sharply—particularly copper and nickel which may disappear from some consumer items.

Strict Enforcement — Word has gone out from DPA for strict enforcement of controlled materials regulations. Effective at once, DPA will crack down on all violations that appear wilful in nature. Agency officials feel that time enough has gone by for business and industry to have become generally familiar with controls. They claim the agency has been "very lenient" to date.

The enforcement drive has already started, in fact, with more than 200 investigators in action. Last week, one manufacturing firm was haled into court on a 12-count indictment, charged with diversion of steel.

Two hearings were started for the purpose of deciding whether criminal charges should be preferred. Officials said that there were 25 other investigations being conducted into charges of "serious violations" of control rules and regulations.

Price Assured — New copper production amounting to 197,000,000 lb, from American Smelting & Refining's Silver Bell Mine facilities in Arizona, is being underwritten by the government, which has offered to take all but 20,000,000 lb at a 24½¢ price.

Under terms of an agreement signed with Defense Materials Procurement Agency, the company is free to sell its copper on the open market.

The Silver Bell field is expected to yield more than 36,000,000 lb annually in 2 years.

Calls for Arms Czar

A "procurement czar" will be needed to direct the nation's rearmament program if a high level of preparedness is going to be attained soon, reported the Senate Armed Services Preparedness Subcommittee.

Military production, the group said in a 19-page report, is "dangerously behind schedule" despite the country's capacity to reach goals set by top defense officials. The report asserted "no further delay can be tolerated" in breaking production bottlenecks.

Accompanying the document was a statement from subcommittee chairman Lyndon B. Johnson, D., Tex., to the effect that the U. S. has let months go by "in a fruitless search for a formula that will give us both butter and guns in ample quantities."

Grinding the bearing diameters of a large sleeve gear. Preventive maintenance goes a long way toward expediting precision grinding operations of this type.



Helpful Hints for Long Service From Your Cincinnati **FILMATIC** Plain Hydraulic Grinding Machine

You have a right to expect long service from your centertype grinding machines. And it's easy to get it from Cincinnati's, for they give you a head start with their FILMATIC grinding wheel spindle bearings. A few points which require your periodic attention are:

LEVELING Improperly leveled machines can be the source of many troubles. Jacks are built-in to facilitate the operation of leveling. Washers must be placed beneath the screws. Place the leveling instrument as indicated in the illustration; both lengthwise and across the ways.

LUBRICATION of your CINCINNATI FILMATIC Plain Hydraulic Grinder is simple and easy; do not neglect it. As a reminder, make a lubrication chart, similar to the one in the instruction book, and attach it to your machine.

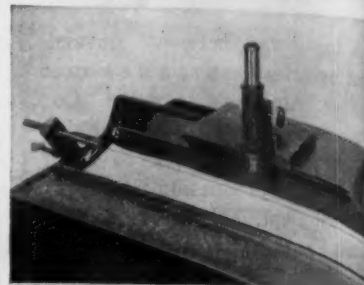
OIL FILTERS Replace the hydraulic and way oil filters every six months. It's easy to do, and they're inexpensive. Remove and clean the spindle oil strainer every six months.

CINCINNATI

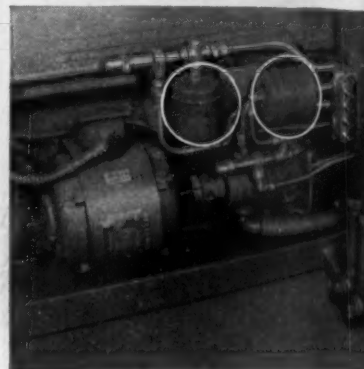
130



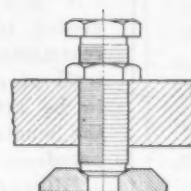
Suggested method of precision leveling the machine.



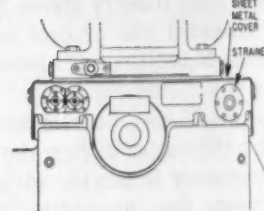
Microscope aligning instrument, recommended for 72" and 96" length machines. (Extra equipment)



Hydraulic and way oil filters.



Built-in leveling jacks provide a way to accurately level the machine.



Location of strainer in spindle oil reservoir.

If you will take these three ounces of prevention, you will be well repaid in trouble-free, accurate performance for years. And if you're not acquainted with CINCINNATI FILMATIC Plain Hydraulic Grinding Machines, write for literature. Ask for catalog No. G-603.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

THE IRON AGE

STEEL: Will It Be Subsidized?

More talk of government paying conversion costs . . . ODM, OPS and DPA all approve . . . Price pass-on provision not being used . . . Details of plan not worked out as yet.

Government subsidies, or their equivalent, for the purpose of encouraging use of conversion steel is again a very live subject.

Chances are that shortly some government agencies will buy limited quantities of premium priced ingots, pay for processing them into desired forms, and then turn them over to contractors at normal or going market prices.

Indication that the Office of Defense Mobilization is seriously considering such action was given by Director Charles Wilson in testimony last week before the Congress Joint Preparedness Subcommittee.

Industry Reluctant—If procurement of conversion steel by defense contractors becomes necessary to maintain production levels, he said, even though it costs more, the government should go along.

Provision has been made by the Office of Price Administration for manufacturers to pass on—within limits—any additional cost brought about by use of conversion steel (Amend. 28, CPR 22). But Mr. Wilson seems to believe that this would be too complicated for general application to defense contracts.

And, in any event, industry has been reluctant, for one reason or another, to take advantage of the out offered by OPS. Some manufacturers label it "impractical."

Fleischmann Approves — But some form of subsidy for getting conversion steel into production channels also has the approval of DPA Administrator Manly Fleischmann. He points out that this and other forms of support by the government is nothing new. "My present thinking," he says, "is that we probably should extend the marginal policy to steel

—on a relatively small and temporary basis."

The DPA head adds that he is already "exploring with a number of agencies the possibility of their using premium price steel."

Last week, for example, Maritime Administration asked for an extra allotment of plate in order to start five ships that had already been deferred for several months. The appeal was turned down. There just wasn't any extra plate.

Conversion Costs — However, Fleischmann told the agency, if it could see its way clear to "assume the extra cost of conversion steel, additional authorizations can be made for the ship construction program."

A similar proposition has been made to Defense Transport Administration in connection with construction of tugs and barges.

Nobody Knows—How such procedure would be worked out generally is still to be decided although it is understood that one or



two "minor" deals with industry are about to go into effect.

Nor is there any reliable estimate of the amount of steel that might be involved. In some quarters, it has been indicated that from 50,000 to 500,000 tons per quarter might be converted with subsidy procedure.

Kaiser Aluminum Files With SEC

Kaiser Aluminum & Chemical Corp. last week filed a registration statement with the Securities & Exchange Commission covering a proposed offering of 350,000 shares of cumulative preferred stock.

Net proceeds will be used to help finance Kaiser's \$100 million expansion plans for present aluminum and bauxite mining facilities here and in Jamaica.

Par value of the stock is listed at \$50 a share but no offering price has been yet stated. Provision will be made for conversion into common stock through 1961.

Putnam Picked as New ESA Head

One of the nation's most demanding preparedness jobs, that of heading the Economic Stabilization Agency, now is in the hands of a Springfield, Mass., industrialist, Roger Lowell Putnam.

President of the Package Machinery Co. since 1927, the new ESA chief was a pioneer in labor relations activities in central New England. He is a director of the Van Norman Machine Tool Co., Gordon Pew Fisheries, and the Springfield National Bank.

Putnam had previous government experience as director of the Office of Contract Settlement, an agency with which he began service in 1944. He has been in the Navy in both World Wars.

Lerten Named OPS Official Head

Erwin Lerten, wartime chief counsel of the machinery branch, Office of Price Administration, has been appointed Chief, Coordination of Adjustments and Procedures Division, Office of the Chief Counsel, OPS.

Industrial Briefs

King Size — GOODYEAR TIRE & RUBBER CO. will construct what is said to be the largest industrial warehouse in the South at Gadsden, Ala., on a 10-acre site under a single roof. The warehouse will be 400 ft wide and 1000 ft long and will have capacity for loading 16 freight cars and 20 trucks simultaneously.

Furnaces for Allenport—Two slab heating furnaces with a capacity of over 100 net tons per hr each will be built by Rust Furnace Co. to serve PITTSBURGH STEEL CO.'s new 66-in. hot strip mill at Allenport, Pa.

Bullet Jacket Parts—Production of 50 cal bullet jacket cups of gilding metal clad on steel will start at AMERICAN CLADMETALS CO in 1952. Company now produces parts for jet planes, motor radiators and interference shields for communications equipment.

More Ferrosilicon—Production of ferrosilicon and calcium carbide will be doubled at the Portland, Ore., plant of ELECTRO-METALLURGICAL CO. sometime in 1952. Contracts have been let for the new building with Bethlehem Pacific Coast Steel Corp. supplying and erecting the steel and Raymond Concrete Pile Co. driving the piling.

Chlorine Unit — PENNSYLVANIA SALT MFG. CO. will add new facilities, including an electrolytic chlorine-caustic soda unit at its Calvert City, Ky., works, at an estimated cost of \$8 million. HOOKER ELECTRO-CHEMICAL CO. plans to build a \$10 million chlorine and caustic soda plant at Montague, Mich.

Announcement — The International Organization for Standardization (IOS) will hold its triennial meeting at Columbia University, New York, June 9-21, 1952. AMERICAN STANDARDS ASSN., U. S. member of the IOS, will act as host.

Larger Quarters — RELIABLE SPRING & WIRE FORMS CO., 3167 Fulton Road, Cleveland, moved into new, larger general offices on the ground floor of the building which they have occupied for some time. Manufacturing facilities have been expanded about 25 pct.

In Service—MISSISSIPPI VALLEY BARGE LINE CO., St. Louis, has placed in service another powerful new towboat. The 176-ft vessel was built by Dravo Corp. and was christened the "W. S. Rhea," in honor of the barge line's chief inspector and oldest employee in point of service.

Canadian Business—Creamery Package Mfg. Co. of Canada, Ltd., has been named exclusive Canadian representative of the U. S. AIR CONDITIONING CORP. and will handle the complete line of air conditioning, heating and ventilating equipment.

Transfers Division—Charles H. Besly & Co., manufacturers of grinders and taps, will transfer its industrial supply division to the BARRETT-CHRISTIE CO., on Jan. 1. This move follows Besly's decision to concentrate on its manufactured products. Barrett-Christie will assume responsibility for serving Besly's mill supply accounts.

Opens New Plant—The center core of of an aircraft components plant which has the capacity to expand physically to 500 pct if necessary has been completed by GARRETT CORP. for its division, AiResearch Mfg. Co. of Arizona at Phoenix. A unique feature of the "erector set" plant is that vital defense production is going on right along with construction.



New Plant — CONTINENTAL CAN CO., will manufacture components required for the control of guided missiles now being developed by Bell Telephone Laboratories and produced by Western Electric Co. for the Army. A separate plant to handle this project has been opened in the Clearing district in Chicago, known as Clearing Defense Plant and will become a part of Continental's metal division.

Eastern Reps.—TACO WEST CORP. Chicago, recently appointed Norman Brager Co. as their representative in the Northern New Jersey area, and Gibson Engineering Co. as their New England representative.

District Office—A new district office was opened at Harrisburg, Pa., by MINNEAPOLIS - HONEYWELL REGULATOR CO. and is located in the Kline Village development.

Moves Offices — BIGELOW-LIPTON CORP. celebrated its 25th birthday by moving to larger and up-to-date general offices at 2550 W. Grand Boulevard, Detroit.

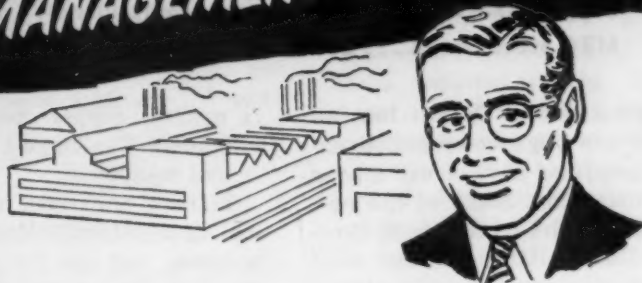
Indiana Agent—Luther & Pederson Inc., 565 W. Washington Blvd., Chicago, have been appointed Indiana representatives for the MINSTER MACHINE CO., mechanical power press manufacturers.

Into Production — GERITY-MICHIGAN, Adrian, expects to go into production soon on hard chrome plating of Army cannon tubes. A \$500,000 addition to the company's plant at Adrian is being built to house the new plating plant. Also being erected is a new building to produce sand mold magnesium castings under a U. S. Air Force contract.

Strike Total Down—Strikes during September numbered 400, as compared with 425 in August, BUREAU OF LABOR STATISTICS reports. Man-days lost from strikes in September totaled 2,400,000, a decrease of 350,000 from the previous month. Four strikes—Caterpillar plant, Peoria, copper-lead-zinc mines; Wright Aeronautical, New Jersey and Douglas Aircraft in California, caused one third of September idleness.

EFFECTIVE PENSIONS

A Problem Common
to Both
MANAGEMENT and LABOR



BOTH MANAGEMENT AND LABOR are seeking the best method of solving the retirement problem. A real measure of financial security is the goal, but there is no standard method for achieving this goal. The great variation in earnings and working conditions in companies and trades create the need for different approaches to the common problem.

Our Pension Trust Division has acquired a unique experience in developing all types of pension systems for a great number of trades and businesses. This experience can be invaluable in working out a pension plan to fit the income and employee benefit requirements of your company. We shall be glad to discuss with you any pension problem you may have, including pension costs. No obligation whatever.

WE ACT AS TRUSTEE UNDER
PENSION AND PROFIT-SHAR-
ING PLANS AND AS AGENT
FOR INDIVIDUAL TRUSTEES.



Write or call the
PENSION TRUST DIVISION,
The National City Bank of New York
and
City Bank Farmers Trust Company.
Ask for our Pension Booklet IA4.

CITY BANK FARMERS TRUST COMPANY

Chartered 1822

HEAD OFFICE: 22 WILLIAM STREET, NEW YORK

Affiliate of

THE NATIONAL CITY BANK OF NEW YORK

Established 1812

The Automotive Assembly Line

New Engine Programs Still Active

High compression projects not shelved . . . Skilled labor is biggest shortage . . . Farm consultants hired . . . See more MRO steel issued . . . Dealers knock K-F-Sears auto sales plan.

Reports out of Detroit that all of the new high compression engine programs have struck a snag are misleading. Some of the new V-8 engines are on the shelf. However, Dodge, Buick and the Ford tractor engines are still strong possibilities.

In the case of Dodge, a large amount of equipment is already on hand. Some vital machines are lacking but Dodge is energetically pushing the project. The same goes for Buick and the tractor engine for Ford.

Keep On—Several of the new auto engine programs have already advanced so far that both the machine tool manufacturer and the auto maker would be seriously inconvenienced if the programs are brought to a halt.

Barring all-out war, these programs can be expected to go forward. Efforts are being redoubled to turn out as many of these machine tools as possible before the Feb. 1 deadline.

Help Wanted—It is freely claimed in Detroit that the real bottleneck in defense production

is neither copper nor steel nor aluminum. The biggest shortage is skilled manpower.

Trained craftsmen are already seriously short. Machine tool builders, tool and die and captive shops of the automobile manufacturers are seriously lacking in skilled workers.

An aggravating factor in the situation is the number of skilled Detroit toolmakers who have been lured to the West Coast. Another factor in the situation is that the number of apprentices trained in recent years falls far short of the present demand.

Experienced—Dearborn Motors Corp., national marketing organization for the Ford tractor and Dearborn farm equipment, believes in utilizing the skill and knowledge of veterans in the agricultural field. During the past week Dearborn named Prof. Harry B. Walker, Davis, Calif.; Dr. J. Brownlee Davidson, Ames, Iowa; and J. B. Wilson, Auburn, Ala., as consultants.

Prof. Walker is emeritus at the University of California, College of Agriculture. Dr. Davidson is

past president of the American Society of Agricultural Engineers and has served as professor of Iowa State College since 1919. Mr. Wilson is a well known authority on agriculture in the South and has served as an engineering consultant for the government's TVA program.

Indications point to increased production of service parts made of steel during the next few months. Several suppliers of replacement parts for the auto industry report they are getting more help in obtaining steel than they have at any time during the postwar period.

Although a number of parts suppliers have not found a home for their tickets, several major auto firms have stepped in to help solve their materials problem. This has resulted in an increase in production schedules of several Detroit firms making service parts for the automobile industry.

Mail Order?—Kaiser-Frazer's plan to distribute passenger cars through Sears & Roebuck in the Southwest may be regarded as another bold venture by Henry Kaiser into uncharted territory.

Reaction to the K-F distribution plan has been mixed. Most recent reports reaching Detroit have been favorable although strong negative reaction by dealers was evidenced when the announcement was made.

The National Automobile Dealers Assn., which naturally views any such moves with alarm, adopted a strong resolution, pointing out "that this method of retailing and merchandising of passenger cars can only lead to disruption of established automobile retail practices and, regardless of promises to the contrary, the purchasers of these vehicles may suffer from lack of availability of replacement parts and good service."



DREAM CAR: Experimental Chrysler sports sedan, K-310, represents an American engineering idea of the sports car. Designed here, it was built in Turin, Italy by Carrozzeria Ghia. Chrysler has not yet decided whether to produce the car for sale.

PONTIAC: Shows New Hydra-Matic

Latest GM transmission has two driving ranges . . . Special provisions for traffic, hilly country . . . Ford developing model community . . . Report adhesives may replace some rivets.

More details on the new GM Hydra-Matic drive became available this week when the new 1952 Pontiac models were introduced. In addition to the new transmission, Pontiac has boosted its compression ratio. The 1952 cars will have a low reduction axle. No major body changes have been made.

With the new drive unit, the car owner has two optional driving ranges. One range has the normal first, second, third and fourth gear speeds. The second range has a new first, second and third gear.

The latter is particularly adapted to driving in congested traffic and hilly or mountainous territory.

In Third—When driving in the 1-2-3 range, the car normally remains in third gear. This offers flexible driving and increased engine braking. The arrangement also allows a lower gear axle ratio. Reduction in third gear in Pontiac's Hydra-Matic is 1.45 to 1.

The Dual-Range Pontiac is designed for driving along a fairly level road in the 1-2-3-4 range. When a hilly section is encountered, it may be desirable to change into the traffic range. This can be done merely by moving the control lever so that the arrow is on the right side of the "DR" position.

Pressing the accelerator to the floor accomplishes a downshift in either of the driving ranges. This may be used in passing another car on an upgrade. When in the 1-4 range and car speed below 60 mph, the transmission shifts down to third gear. When in the 1-3 or traffic range and car speed below 20 mph, the transmission drops into second gear.

Easy Starting—Another improvement is starting in second gear with the lever in the "LO"

position. This is an advantageous arrangement when driving on icy roads.

The new top compression ratio will be 7.7 to 1. On standard cars equipped with synchro-mesh transmission, the compression ratio remains at 6.8 to 1.

Ford Plans Model Community

Ford Motor Co. will develop 4500 acres of land in Dearborn into a model community. Preliminary studies have been completed and a New York planning firm will prepare a detailed outline for residential and commercial development with provision for churches, schools, playgrounds and parks.

A civic and community center and a sports arena are included in the program. An advisory group comprised of governmental, civic, educational and business leaders in Dearborn will collaborate with Ford and the consulting firm in planning the development.

Adhesives Instead of Rivets?

A. J. Kearfott and C. W. Roush of General Motors Research Laboratories reported to the American Society of Mechanical Engineers last week on the use of heat resistant adhesives in place of rivets in brake and transmission assemblies.

In laboratory tests on a brake dynamometer with 500 lb pressure per sq in., the adhesive bond between the brake lining and the brake shoe withstood temperatures as high as 1021°F without failure of the bond, according to the GM investigators. This is a more severe test than any motorist can devise, the investigators said.

THE BULL OF THE WOODS

By J. R. Williams



Best way to find more scrap



Steel scrap—needed to keep the nation's mills rolling—grows scarcer every day.

Unless more scrap is found and turned in, steel users—and therefore the preparedness program—will suffer.

You manufacturers of steel products can do the most to improve the situation. And the best way, the proved way, is this: Use your *shoe leather*. Walk around your plant and property and keep your eyes

peeled for every possible piece of iron and steel scrap.

Chances are you'll be surprised at the amount of old machinery and obsolete tools that can be recovered as scrap. Example: Simply by looking around, one West Coast plant recently turned up 120 carloads of scrap—over 3300 tons. That's money in the till!

So start using your shoe leather *now*. Help get in the scrap that will mean more steel for you!

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK

West Coast Report

West Coast In On Steel Barter

Two mills will ship steel to England this month . . . Scrap remains a headache for producers in the area . . . West follows national pattern on steel —By R. T. Reinhardt.

At least two West Coast producers may be contributing to the swapping arrangement of American steel to England in exchange for Canadian aluminum.

Isaacson Iron Works and the new operation of Seidelhuber Steel Rolling Mills, both in Seattle, have contracts with the British Iron and Steel Corp. to supply ingots.

Start This Month—Isaacson will ship its total output to the foreign firm. About 6000 tons will be ready this month. It is anticipated that shipments will reach about 8000 tons per month next spring when the power shortage eases and if scrap is available.

Seidelhuber expects to run test heats in its electric furnace this week and get into production Dec. 20. Contract with the British company calls for delivery of 10,000 tons of ingots by middle of March, 1952. About 1000 tons are expected to be delivered this month.

For Own Mill—After March the company expects to use its total furnace capacity to provide ingots for its own rolling mill. Mill machinery is enroute to Seattle now. It includes a 24-in. mill with two three-high stands and one two-high stand. There will be two roughing mills in addition to the finishing mill.

Scrap is being delivered to the new operation this week with commitments having been made for 2 months' supply.

Seidelhuber is now considering purchase of a 70-ton electric furnace early next year to be in operation by middle of 1953. Furnace now being completed has a pro-

duction capacity of approximately 4500 tons per month.

Where to Get it?—That is the question steel producers are kicking around about scrap as they watch steelmaking capacity added in the West.

Another 50,000 tons of purchased scrap will have to be dug up annually when Geneva Steel Co. gets its new openhearth in operation early in 1952. The company is already scraping the barrel. Ordinarily it carries an inventory of about 40,000 net tons and middle of last month was down to 8000 tons. Current consumption of purchased scrap is about 90,000 tons per year.

Of no help to the industry is the strike against National Metal and Steel Co.'s ship breaking operation on Terminal Island, Calif. A dribble of good material has been cut off as company and Inter-

national Longshoremen and Warehousemen Union leaders negotiate their differences.

No Better, No Worse—Western steel users are on par with those in other parts of the country as far as supply goes, according to Francis S. Howard, division vice-president of Columbia Steel Co.

He told the state-wide meeting of the California State Chamber of Commerce at Los Angeles last week: "We seldom have regional steel shortages except in isolated circumstances and in particular products. Thus, steel will remain in tight supply in California as long as it is tight nationally."

Talking about increases in steel production in the West, Mr. Howard pointed out that prior to World War II, we were only producing 28 pct of the steel consumed in this area. "Today," he said, "we produce about 60 pct of our consumption. But at the same time the steel market on the West Coast has doubled in 10 years."

Smoke Weighs Heavy—To point up the effectiveness of smog control, Gordon Larson, who heads the anti-smog commission in Los Angeles County, told THE IRON AGE that the electrostatic precipitators on the stacks of Columbia Steel Co.'s four openhearths at Torrance, Calif. each day collected a total of 3½ tons of waste material. It has been estimated that before controls were made compulsory about 40 tons of particulates were being thrown into the air by southern California metallurgical plants.

Columbia and others are seeking some use for the material.

Tests will be made Dec. 10 to determine whether the dust and fume collectors on the electric furnaces of Bethlehem Pacific Coast Steel Corp. in Los Angeles meet the stringent requirements of the anti-smog commission.



5 METALS IN PRECISION-MADE REEL MACHINED WITH ONE SUNICUT OIL

The Ocean City Manufacturing Company operates Brown & Sharpe automatics on free-turning brass, aluminum, cold-rolled steel, phosphor and hardware bronze. Having used Sunicut Cutting Oils since 1941 with complete satisfaction, the plant decided a year ago to find out what other products could do. Numerous competitive oils were tested, and the best was selected for a long trial run.

But this oil did not prove satisfactory in actual use. It caused the gibs to corrode and the slides to stick. Operators found miking difficult. Downtime and rejects grew to disturbing proportions. Finally, to protect

its automatics and restore its production efficiency, the plant decided to go back to Sunicut Cutting Oils and standardized on Sunicut 11.

Sunicut 11 is a "Job Proved," dual-purpose cutting oil for automatic screw machines. Its transparency permits quick and accurate miking. Among its virtues is the fact it will not stain brass. It drains rapidly, minimizing carry-off. And its high lubricating and cooling properties aid in prolonging tool life and improving finishes. Moreover, it protects finished parts from rust and corrosion. For other outstanding cutting oil case histories write for booklet IA-12.



MACHINE: Brown & Sharpe No. 2G • **METAL:** 11 ST aluminum
OPERATIONS: Feed stock, center drill, counterbore, recess and countersink, tap, form and cut off • **SFPM:** 800 • **SPEED:** 3,150 rpm
PRODUCTION: 250 collar housings per hr. • **CUTTING OIL:** Sunicut 11

MACHINING PARTS for Ocean City's "90" Automatic Reel. Sunicut 11 does not corrode the bronze gibs of the automatics, minimizes carry-off, makes miking easy. A coolant tried as an "economical" replacement failed on all three counts.



THIS AUTOMATIC REEL contains six types of metals . . . free-turning brass, aluminum, cold-rolled and stainless steel, phosphor and hardware bronze. Another Sunicut grade is used on the stainless steel.



THE PRECISION PARTS that Sunicut 11 helps to make possible are put to the test as this top-quality reel goes into action. Little does the fisherman know how much of his pleasure he owes to a cutting oil.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL



Machine Tool High Spots

Labor Biggest Hurdle to Production

NPA spokesman estimates toolmakers will need from 18,000 to 25,000 more men . . . Workweek stretches up to 50 hours . . . Not much help on labor can come from capitol—By G. Elwers.

Availability of labor is the one remaining major obstacle to rapid expansion of machine tool production, NPA machine tool experts believe. But it is a big one. An NPA spokesman estimated last week that the industry needs an additional 18,000 to 25,000 workers to man production facilities existing or under construction.

Working the Limit—The work week in the industry currently is between 47 and 50 hours, and is more in many plants. But in many plants even the normal first shift does not have all the workers the plant has capacity for.

And in very few plants is there more than a skeleton second or third shift. Unfortunately most machine tool production is centered in areas where skilled labor is extremely hard to find.

Little Help—Though NPA says it has some remedial measures under consideration, it admits little can be done about manpower by Washington in a semi-war economy. The major help it has been able to deliver is on wages.

It has worked with the Wage Stabilization Board on permitting machine tool builders to meet or exceed defense plant wages.

No Comment—The rather rosy view on other obstacles to increased machine tool production which NPA holds was not echoed in the recent report of the Johnson Senate watchdog committee on defense production. Discussing the lag in production due to machine tool shortages, the committee named five principal blocks to

machine tool production. Labor was not one of them. The committee said: "We are told that, except for the component-parts situation, these obstacles appear to have been removed. Our own preliminary inquiry suggest this statement may be overly optimistic."

Told You So—Machine tool builders were fascinated by the committee's list of obstacles to expanded machine tool production, and its statement that "the period since Korea finds us with machine tool problems which parallel the problems existing prior to World War II production even though those problems had actually been anticipated before June of 1950."

The list of obstacles is exactly those which the industry has for over a year been warning Washington about. And the warnings have been based on the experience

with expansion problems in World War II. In other words, a Congressional investigation found out exactly what the machine tool industry has been telling everyone.

Not Dead End—The NPA is anxious to right some incorrect impressions about what its amendment to M-41, the order controlling distribution of machine tool production, will do. It will not prevent the introduction of new models of consumer goods, NPA says, if changes can be made without buying new machine tools.

And the order does not permit shipping to non-priority customers under pool orders.

Wrong Implication—Unclear wording of the new distribution regulations implied that through pool orders, unrated customers could still get machines. Not so, says NPA. A clarifying order has been issued. What it will explain is, that if a machine tool for which there is no priority order comes off a production line, and it is covered by a pool order, the machine will be "delivered" to the General Services Administration.

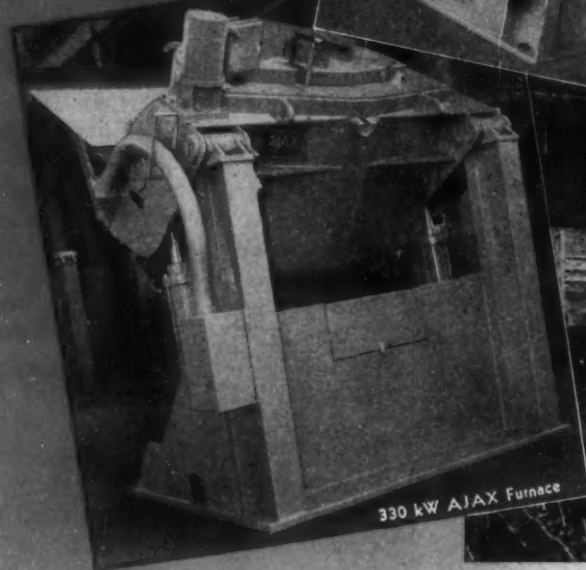
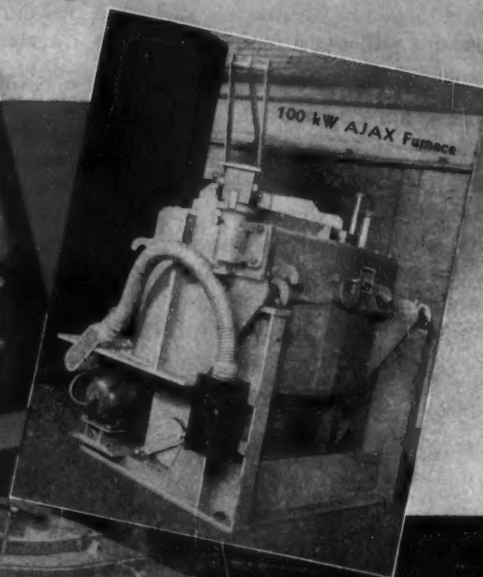
GSA is technically the customer of all pool order machines. What actually will happen is that the machine will be stored by or for GSA for a priority user.

Deliveries—About the only non-rated machine tool deliveries after Feb. 1, says NPA, will be of large, special machines which take a long time to manufacture. These, if near completion, will be allowed under M-41's hardship clause.

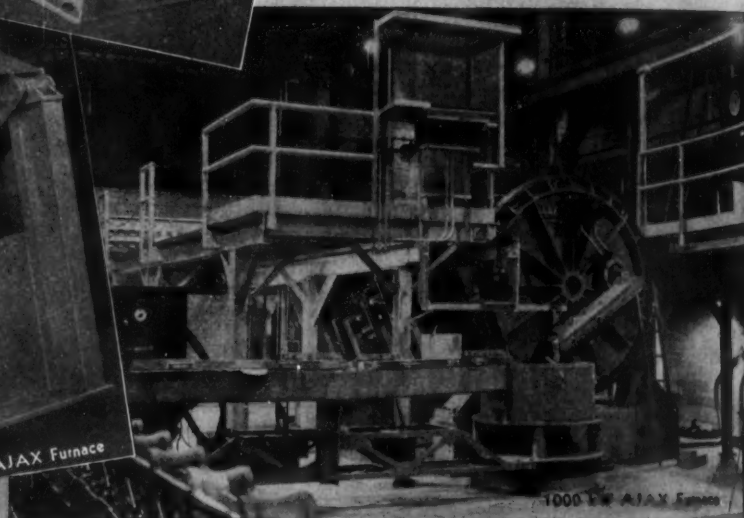
Probably the idea behind this is that these machines, because of their long lead time, were undoubtedly ordered in good faith before the machine tool shortage became serious. This will delight Detroit, since the type of machines described would include the transfer machines for new engines.



Yes! **AJAX** Induction Melting Furnaces are Versatile!



For many years AJAX has been the pioneer in the development of standard frequency induction furnaces for melting metals. Today this type of equipment has been adapted to the full range of nonferrous metals and alloys and to a great variety of sizes ranging from 20 to 1000 kW.



AJAX Induction Melting Furnaces are now used for the following applications: Die Castings, Permanent Mold Castings, Sand Castings, Billets for Rolling and Extrusion, Recovery of Scrap, Galvanizing and Aluminizing of Steel and many others.

For special applications an Automatic Electromagnetic Pump allows continuous feeding of molten metal into the molds as they move past. Hand ladling is eliminated. Temperature, of course, is also automatically controlled and there is no chance of overheating the bath at any time during the melting cycle.

WRITE FOR FURTHER INFORMATION

AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX
TAMA-WYATT



INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Mullgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

The **Iron Age**

SALUTES

William E. Mahin

More than 300 industrial research projects are guided by Armour's capable, conscientious director.



BILL MAHIN, director of research at Armour Research Foundation of Illinois Institute of Technology, refuses to be stymied by dimensions. Coupled with this he has a great, driving energy and a rare sense of duty.

If Bill thinks the solution of an industrial research problem is worthwhile limitations of time, space, personnel, money and technical difficulties can't hold him back. If it's a good project, he finds a way.

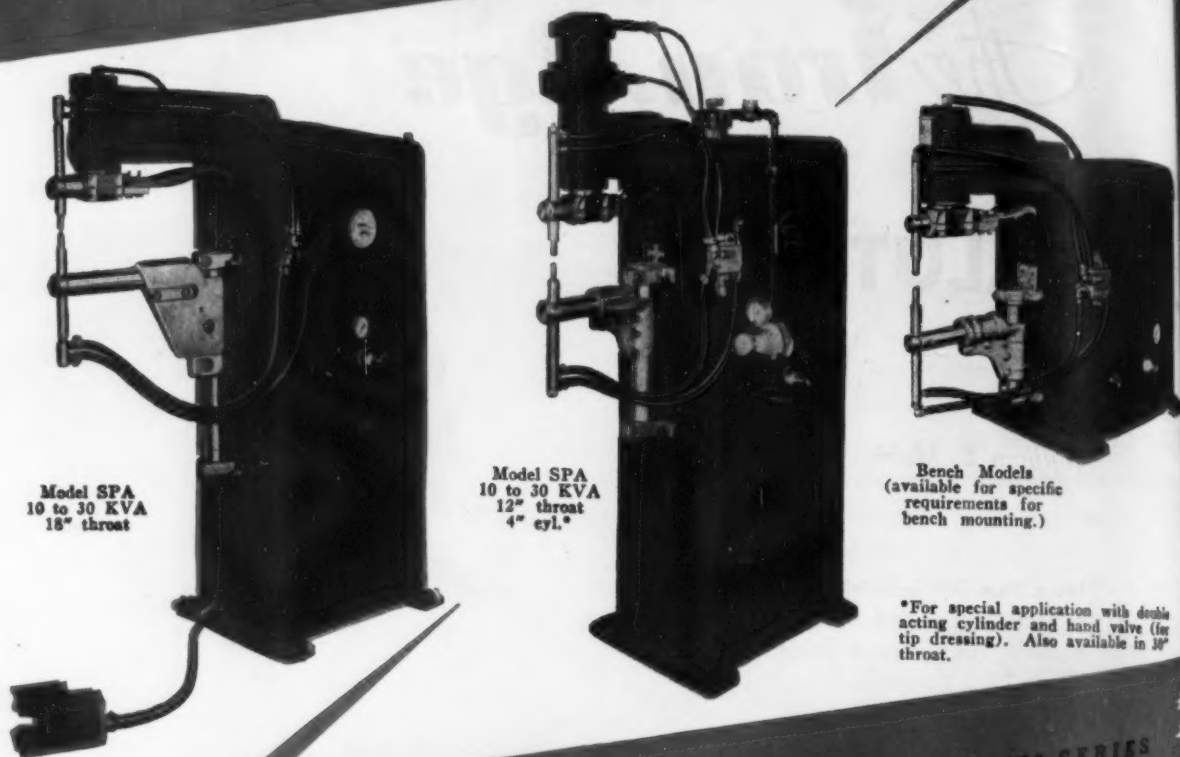
These unusual abilities brought him an appointment early this year as director of the metallurgical projects division of an advisory board of the National Research Council. The board advises the Dept. of Defense on critical metals problems.

Bill started as a metallurgist at Inland Steel Co. and later had charge of research for Vanadium Corp. of America. From 1937 to 1947 he was head of metallurgical engineering at Westinghouse. He joined Armour in 1947 and was made director of research in 1949.

In guiding over 300 projects at Armour, Bill has to be, and is, a good judge of people. He listens to what they say and how they say it. He assumes they know generalities and keeps hammering away at perfection of details.

In addition to his research work Bill is active in ASM, ASTM, AIME and other technical societies. His demanding schedule makes him the world's worst car pool member. He lives with his wife and three children in LaGrange, Ill.

SPEED WITH ACCURACY



Model SPA
10 to 30 KVA
18" throat

Model SPA
10 to 30 KVA
12" throat
4" cyl.

Bench Models
(available for specific
requirements for
bench mounting.)

*For special application with double
acting cylinder and hand valve (for
tip dressing). Also available in 38"
throat.

MODEL SPA SERIES
10-15-20 and 30 KVA

Banner
SPOT WELDERS

do the job faster — and
better . . . special de-
sign and construction
features raise plant pro-
duction and efficiency.

ONLY BANNER OFFERS ALL THESE FEATURES . . .

- ★ BANNER Welders can continuously and accurately weld up to 225 spots a minute.
- ★ Time tested proof of a Banner development is the unique design of ram and cylinder and the long bearing surface of 7".
- ★ Up to 7" adjustment on lower knee.
- ★ Heavily ribbed cast iron head, with integrally cast cylinder provides utmost rigidity.
- Manganese Bronze piston specially equipped with 3 cast iron double seal (automotive type) rings. Reduces friction up to 50% thus permitting necessary follow up after welding cycle.
- ★ Pin and slot arrangement prevents piston from turning.

- ★ Piston actuated by foot switch and solenoid operated valve.
- ★ Heavy duty selector (with contacting pads of ample cross section) provide 8 stages of heat regulation.
- ★ All current carrying members are designed for over load capacity and made of high conductivity copper alloy.
- ★ Secondary and secondary pads are water-cooled assuring dissipation of heat in the horns and laminated shunt.
- ★ Frame is 1/4" boiler plate.

Specific data sheets and catalog available. Write today!

Banner manufactures a complete line of Gun, Seam, Rocker Arm and large Press Welders and Specials to 200 KVA. Inquiries invited.



BANNER Manufacturing Co.

6812 NORTH 43rd STREET • MILWAUKEE 9, WIS.

The Iron Age

INTRODUCES

Edward K. Vaughan, transferred from the Chicago staff of the NEW JERSEY ZINC SALES CO. to the headquarters office in New York. Robert L. Campbell, has been transferred to the metal division and is taking over Mr. Vaughan's duties in the Chicago territory.

H. Barden Allison, appointed as district sales manager, Philadelphia branch, mechanical goods division, S. RUBBER CO. Mr. Allison succeeds A. B. Means who continues in the capacity of sales advisor.

William R. Newton, appointed salesman for the state of Ohio, by the LAYMONT STEEL CORP., with offices in Cleveland.

Warren P. Moon, promoted to manager of cost research of LUKENS STEEL CO., Coatesville, Pa.

Charles D. McCall, appointed to general sales manager of the New Equipment Div. of GENERAL MOTORS CORP., Detroit.

Lester M. Carroll, appointed assistant sales manager in the Chicago office of DAYTON ROGERS MFG. CO.

John M. Franklin, Paul C. Cabot and Stephen D. Bechtel, elected to the board of directors of CONTINENTAL CAN CO., New York.

L. Reed Clark, named director of industrial relations, Stamford Div., of YALE & TOWNE MFG. CO., succeeding Marvin C. Bonine, recently promoted to works manager of the Salem Division.

Ronald S. Gall, appointed as manager of public relations for the CURTIS-WRIGHT CORP., Woodbridge, N. J., and its divisions.

Karl V. Lindell, appointed vice-president of CANADIAN JOHNSMANVILLE CO., LTD., Asbestos, Quebec, and general manager of the company's Asbestos Fibre Div.

Sherman R. Lyle, named district manager of the steel and tube division, northern Pennsylvania and New York state district, for TIMKEN ROLLER BEARING CO.

Joe M. Deal, appointed as works auditor at the Gary works of U. S. STEEL CO.

Thomas J. Owens and Archer D. Sargent have been named assistant comptrollers of NATIONAL LEAD CO., New York. Winthrop Sargent, Jr., was elected a member of the board of directors; Paul J. Pater, named manager of the Chicago branch; Philip W. Ruppert, appointed assistant manager, metal department; Michael Uss, appointed assistant treasurer; Thomas J. Murphy, has been made assistant secretary.

Charles E. Nelson, Jr., elected a director of WAUKESHA MOTOR CO., Oakland, Calif.

L. H. Bender, named superintendent of manufacturing control and contract administration for LUSCOMBE AIRPLANE CORP., Dallas.

Paul E. Rapp, joined FOOTE MINERAL CO., Philadelphia, as assistant treasurer.

Charles J. Paumier, appointed the Pacific Coast representative for the ELECTRIC FURNACE CO., and will be located in Los Angeles.

George P. Long, joined the CLEVELAND CHAIN & MFG. CO. as assistant general sales manager.

Turn Page



FRANKLIN E. TURTON, recently elected as vice-president of Braden Copper Co., New York, a subsidiary of Kennecott Copper Corp.

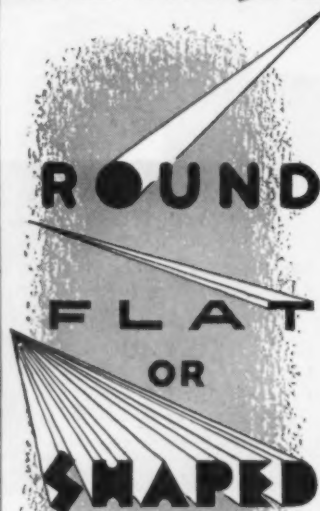


GEORGE A. DEWEY, appointed comptroller of National Lead Co., New York. Mr. Dewey joined the company's accounting department in 1924.



WILLIAM W. FULLER, recently appointed purchasing agent of the Cleveland Chain & Mfg. Co., Cleveland.

PAGE WIRE



LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

**You draw the Shape
—Page can draw
the Wire**

—the way you want it
for your production—whether
it's ALL of your product,
or only a part.

Cross-sectional areas up
to .250" square; widths to $\frac{3}{8}$ ";
width-to-thickness ratio
not exceeding 6 to 1.

**for Wire or
Information about Wire—**

*Get in touch
with Page!*

ACCO



Monessen, Pa., Atlanta, Chicago,
Denver, Detroit, Los Angeles,
New York, Philadelphia, Portland,
San Francisco, Bridgeport, Conn.

**PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE**

Personnel

Continued

R. A. Millermaster, appointed manager of the development department of CUTLER-HAMMER, INC., Milwaukee. C. W. Kuhn has been appointed director of development engineering for the company.

Arthur H. Luchs, elected vice-president of ROUND CALIFORNIA CHAIN CO., South San Francisco.

Robert J. Minshall, appointed president and general manager of the Marvel-Schebler Products Div. of BORG-WARNER CORP., Decatur, Ill. G. V. Patrick was appointed vice-president and assistant general manager of the division. Mr. Minshall succeeds S. W. Gray who has retired.

Henry G. Chiles, named manager of sales promotion and advertising for the piston ring department of KOPPERS CO., INC., Baltimore, succeeding C. B. Riddick who has resigned to enter business for himself.

Iver J. Freeman, named manager of the new Detroit sales office of REED-PRENTICE CORP.

W. H. Webb, appointed sales manager of alkali products for DETREX CORP., Detroit.

Francis M. Davison, appointed as assistant treasurer of AEROQUIP CORP., Jackson, Mich. William L. Parlon, has been named general manager of Elbeeco, Inc., wholly owned subsidiary of Aeroquip.

J. J. Merkel and E. E. Klemm, appointed branch managers of the Detroit and Cleveland districts, respectively, for QUAKER RUBBER CORP.

R. P. Parshall, becomes regional manager, Southeastern region, for CUMMINS ENGINE CO., INC., with headquarters at Atlanta.

John F. Rittenhouse, named executive vice-president of C & D BATTERIES, INC., Conshohocken, Pa. Henry E. Jensen has been appointed chief engineer.

Frank D. Davis, appointed public relations manager for NATIONAL GYPSUM CO., Buffalo, replacing David A. White, Jr., now on active duty with the Air Force.

J. D. Turner, named director of publicity and promotion for BARBER-GREENE CO., Aurora, Ill.



PHILIP RYAN, appointed executive vice-president of Cutler-Hammer, Inc., Milwaukee.



HENRY A. DENNY, appointed production manager, Engineering and Construction Div. of Koppers Co. Inc., Pittsburgh.



JAMES B. MCCLELLAN, appointed as factory manager, in charge of all manufacturing activities of Standard Steel Corp., Los Angeles.



E. H. HOLT, recently named general sales manager for the Barber-Greene Co., Aurora, Ill.



A. P. Green KX-99

Produce Extra Tonnage and Smoother Operation in Blast Furnaces

KX-99 Blast Furnace Brick were developed to match the properties of a brick with the service requirements of the blast furnace. They were developed to resist carbon monoxide disintegration, slag action, chemical action and abrasion. In addition, special attention has been given to the volume stability and hot load bearing properties of KX-99, which are especially important factors for service in bottom blocks.

Complete KX-99 Blast Furnace Linings have produced record tonnages for leading steel companies. KX-99 are also recommended for service in Hot Metal Mixers and Hot Metal Cars.



OTHER A. P. GREEN PRODUCTS

Proved in Service
BY THE STEEL INDUSTRY...

MORTARS • LOXOL • KD-2
SAIRSET • SATANITE
CASTABLE REFRACTORIES •
KAST-SET • KAST-O-LITE
SPOOL CHECKERS
FIREBRICK • MIZZOU • MEX-KO
CLIPPER • EMPIRE
PLASTIC FIREBRICK • SUPER-
PLASTIC • PLASTIC QUIK-PAK

A. P. GREEN FIRE BRICK COMPANY
Mexico, Missouri, U. S. A.

In Canada:

A. P. GREEN FIRE BRICK CO., LTD.
Toronto 15, Ontario

Distributors in the Principal Cities of the World

Check These OUTSTANDING PROPERTIES OF KX-99:

1. Burned to Orton Cone 23.
2. No sign of carbon monoxide disintegration in 1,000 hour test at 900° F. In all completed furnace campaigns, no carbon monoxide disintegration was found.
3. Apparent porosity in the range of 8 to 12 per cent with an average of 10 per cent.
4. Bulk density in the range of 2.30 to 2.40 grams per cubic centimeter.
5. Average modulus of rupture 1800 to 2500 pounds per square inch.

KX-99 Blast Furnace Brick are manufactured to extremely close tolerances... uniform in dimensions... free from warpage.



SEND FOR FREE BOOKLET

A. P. Green Fire Brick Co., Mexico, Mo.

Please send me a copy of your booklet, "KX-99 Refractories for the Steel Industry."

Name.....
Firm Name.....
Address.....
City.....Zone.....State.....



Electro

ADAPTABILITY *Could Be What You Need!!*

As your requirements become more exacting and your practices more individual, your need for grinding wheels *engineered to your requirements*, becomes imperative.

For that reason, we operate with an unusual adaptability in resources and resourcefulness.

We are equipped both mentally and physically to depart from "standard practices" with grits, bondings and wheel forms, to produce wheels with a take-off efficiency that will pay off for you.

Gains of 45% from applying Electro adaptability are not unusual. Without obligation, may we demonstrate?

ELECTRO REFRACTORIES & ABRASIVES CORP.
344 Delaware Avenue, Buffalo 2, N. Y.
Regional Warehouse: Los Angeles 58, California
Canadian Plant: Cap-de-la-Madeleine, P.Q.

Electro

HIGH-SPEED
RESIN BONDED
GRINDING WHEELS



**Resin Bonded
ABRASIVE WHEELS FOR
CUTTING OFF
PRECISION GRINDING
SNAGGING**

**GRINDING WHEEL
MANUAL 645 AND
SPEED CALCULATOR
Free on Request
Write for Them NOW!**



Personnel Continued

Douglas C. Newman, heads all the sales activities of the Organic Chemicals Department, of E. I. DU PONT DE NEMOURS & CO., Wilmington, Del. Dr. Miles A. Dahlen becomes director of sales, dyestuffs division; Gordon M. Markle, director of sales, fine chemicals division; H. J. Swazey, director of sales, export division; and J. Preston Wills, manager of export sales.

Major Robert L. Brunner, appointed purchasing agent of HIRSH SWANK'S SONS, Johnstown, Pa. G. R. Cope has been appointed manager of the order department.

B. M. (Barney) Laney, named assistant works manager for all aircraft shifts at Willow Run, for KAISER-FRAZER CORP. Hugh Fry, appointed assistant works manager for the first and third shifts. J. V. Banks, appointed chief production engineer.

James J. Larkin, appointed fleet sales manager, Ford division, FORD MOTOR CO., Dearborn.

Harry V. Snow, appointed as general manager, James N. Davis, sales manager, and Leonard J. Heinle, comptroller of the new IOWA FORD TRACTOR CO., Dearborn, a subsidiary of Dearborn Motors Corp.

Edward A. Murray, appointed vice-president in charge of sales of APPLETON ELECTRIC CO.

Clarence W. Wacker, senior sales representative of the automotive, aviation and government division of the B. F. GOODRICH CO. in the Detroit district has retired after 40 years of service, and is succeeded by Colin M. Stewart.

OBITUARIES

Elmer H. Horstman, 52, chief engineer for the steam turbine section of the Allis-Chalmers Mfg. Co.'s power department, at North Freedom, Wis.

John R. McDonald, president of Peerless Machine Co., Racine, Wis.

Leon R. Ludwig, 47, director of engineering and research for the Westinghouse Electric Corp.'s Atomic Power Div., at his home in Pittsburgh.

Raymond Charles Force, 71, first president of Caterpillar Tractor Co. and a member of the board of directors, in Oakland, Calif., recently.

ELECTROFORMING SOLVES SPECIAL PRODUCTION PROBLEMS

The Iron Age
FOUNDED 1853
Technical Articles



by John Kolb
Associate editor

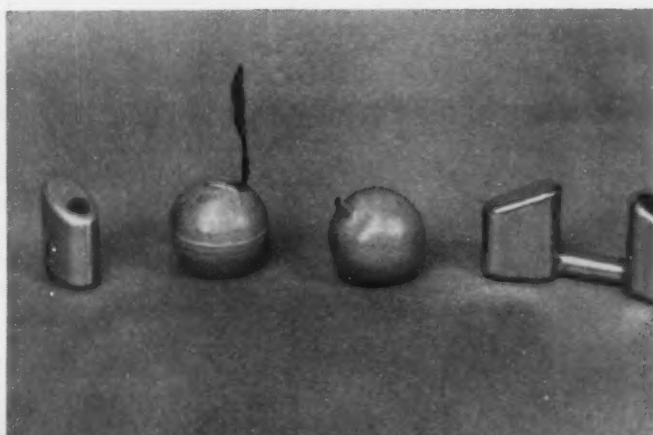
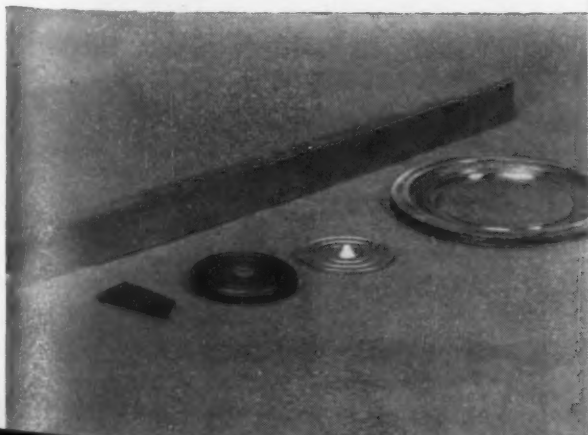
Extra-sharp corners and points, intricate contours, especially tight tolerances—these are some of the difficulties electroforming is overcoming. And because the process is equally adaptable to experimental or large-scale production, it can be used to turn out, first, experimental pieces and, later, production parts.

Large-scale production of metal parts by electroforming received its start after World War II, in peacetime civilian applications. Now it has joined in war production. The fact that electroforming can produce one or one million parts is one of its most important virtues in armament work. Parts have been and are being produced for all the armed services and for equipment ranging from munitions to electrical and electronic items on both production and experimental bases.

A TIGHT TOLERANCE of ± 0.0003 in. was successfully held in producing this rectangular copper wave guide connector, whose wall thickness had to taper from 0.025 in. at one end to 0.010 in. at the other. In the foreground are shown assorted electroformed diaphragms.

Electroforming is plainly and simply electroplating—onto the surfaces of molds or mandrels coated with a parting medium. These are later withdrawn, leaving a shell of electrodeposited metal that faithfully reproduces original contours as close as ± 0.0005 in. With a high-speed deposition rate of 0.010 in. per hr, the metal cross-section built up is of high density. An 0.010-in. wall of pure nickel will satisfactorily retain helium under considerable pressure. Nickel is the ideal material for electroforming,

FLASK-TYPE AND GLOBULAR nickel floats made by electroforming. From left to right: a flask-type float half, a globular float made by the previous method of drawing and soldering two halves, the electroformed product, and the double flask-type float.



Electroforming solves problems (continued)

but copper, silver, iron and several other metals have also been successfully and widely used.

At the Camin Laboratories, Inc., Brooklyn, a 38-ft long oval tank that requires only one operator suspends 500 mandrels in a plating bath, turning out as many as 500 pieces an hour. Such a production rate is not phenomenal in modern industry and it is one of the reasons why electroforming cannot often compete price-wise with machining, forming and other metalworking operations.

Special reasons are required to make its use practical. For example, it is sometimes an advantage and sometimes a disadvantage that in electroforming a metal cross-section gets to be 0.0005-in. thick before it reaches 0.050 in. For designs involving thin sections, this is ideal, since it eliminates machining away large quantities of material or several drawing operations. For heavier walled parts, this factor increases the time and cost of manufacture.

Good for tough contour, surface jobs

Electroforming is best applied to jobs where: (1) experience has shown that no other method can be used; (2) unusual contours difficult to form by other techniques are involved; (3) tolerances are especially close; (4) surface requirements are high.

In civilian production, the caps and barrels of inexpensive pens and pencils were often either electroformed metal or plastic molded in electroformed injection dies (as heavy as $\frac{3}{4}$ -in. wall.) Electric shaver parts, decorative caps and knobs and razor handles were made of plastic plated with metal. Table cigarette lighters with intricate, detailed shapes and decorations were made by electroforming onto individual molds of low-melting-point alloys—later melted out.

Even though such mast molds, which are only

used once, make a job expensive, it was the only means of producing a double flask-shaped nickel float assembly required by one of the armed forces. These floats had to be corrosion resistant, light in weight and dense enough to withstand permanent immersion in oil. They were made by electroforming nickel shells over cast molds, later melting out the molds. The resulting float halves (see accompanying illustration) are then joined together by electroforming them to a short length of tubing. The joint is tighter than could be obtained by soldering or brazing.

Eliminates a series of operations

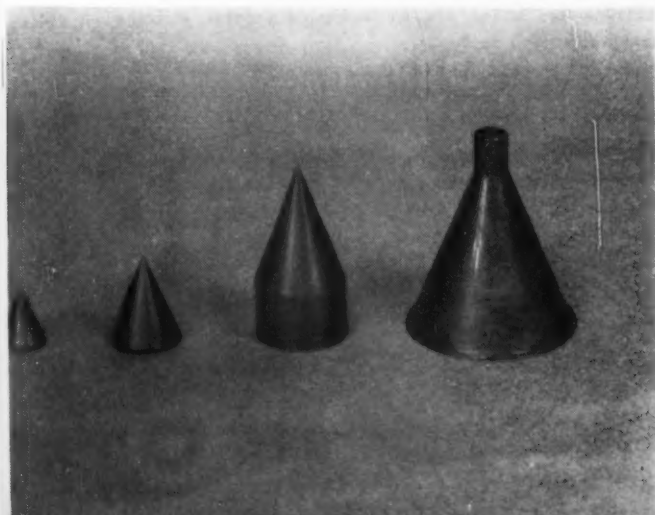
Another nickel float is of a more common type, being globular. Electroforming replaces an unsatisfactory combination of drawing and soldering two sheet-metal halves together. Floats made in this manner had always failed after a short period of use. The short projecting arm required to suspend the cast mold (later melted out) in the electroforming bath becomes an integral tubular part of the finished piece. It provides a ready-made means of attachment to the equipment with which it is used.

Tolerances held within ± 0.0003 in.

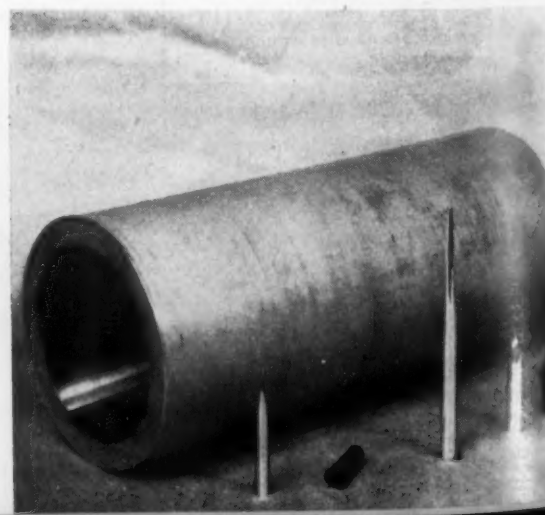
A copper wave guide connector for the electronics field had to have a tapered wall, from 0.010 to 0.025 in., over a length of about 12 in. Tolerances were close, ± 0.0003 in. Inside dimensions had to be kept the same, within ± 0.001 in. The connector was rectangular in shape and sharp corners had to be maintained—too sharp for forming by any other method.

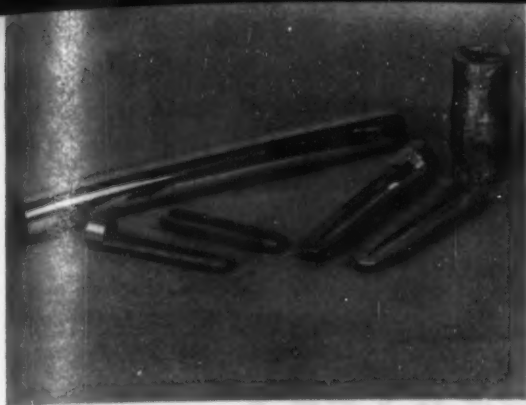
Another job involved the avoidance of taper. A special instrument housing of nickel, 15 in. long, 8-in. ID and with a 0.010-in. wall, had to have a sharp-cornered, interior rim or flange about 1 in. wide and with the same wall thickness. This product, essentially an electroformed, high-precision sheet metal form, had to be made

COPPER CONES electroformed to provide extra-sharp noses, close-tolerance wall thicknesses and concentricity. A wide range of sizes and shapes are possible.

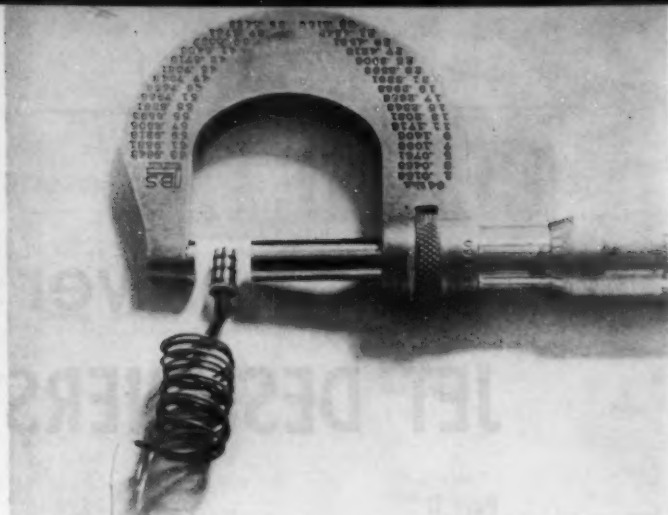


LOOKING LIKE SHEET METAL work, this special nickel instrument housing had to be free of taper and all dimensions had to be held within ± 0.001 in. Assorted round and rectangular tubes with closed, tapered ends are also shown.





ASSORTED WALL thicknesses, from 0.004 to 1/4 in. and heavier are shown in this photograph. Tube in background has a 0.004-in. wall, while injection dies in foreground are "beefed up" for use in plastics production. High finish on cross-sectioned dies is typical of electroforming.



THE SILVER RINGS on this tiny commutator for a synchronized motor were all deposited in a single operation.

to a tolerance of ± 0.001 in. in all dimensions.

Electroformed copper cones in a wide variety of shapes and sizes for ballistics research have also been made to close tolerances. The finished parts had to be of full density and wall thickness had to be held to 0.001 in. at all points. The cones also had to be concentric and required points so sharp that no other means of producing them had been satisfactory.

Silver rings were formed on plastic commutators for a tiny synchronized motor. Because the

rings can all be deposited at once, the number required does not greatly affect their cost.

Another of the accompanying illustrations contrasts the wide range of wall thicknesses it is possible to electroform. A tube with a rounded end is shown having a wall thickness of 0.004 in. (thicknesses as low as 0.002 in. have been successfully produced). Dies for the injection molding of plastics having walls 1/4 in. thick and heavier are also shown. Their perfect mirror finishes are typical of electroforming.

New camera takes 100,000 frames per second

A new camera, developed by Battelle Memorial Institute, Columbus, Ohio, is designed to take pictures at speeds up to 100,000 frames per sec. That is about 10 times the speed of most commercial high-speed cameras.

Designed by C. D. Miller and Arthur Scharf, the camera may find answers to questions that have confronted science and industry for a long time. What causes knock in a piston engine is but one example of the type of problem it may help solve.

This research tool resolves 30 to 40 lines per millimeter on 8-mm film. Thus, detail and clarity of photographs are comparable to those obtained with cameras operating at much lower speeds. Effective lens openings can be made as large as f/2. A single photographic series of 500 frames can be projected as a motion picture immediately after development of the film without reprinting and re-registering of frames.

The Battelle camera takes all photographs through the same lens from the same viewpoint, avoiding the distortion of objects from frame to frame, which occurs when several lenses are used. It can be used to photograph luminous or non-luminous objects, for direct photography, shadowgraphs or schlieren photography. With only one moving part, it is subject to little wear.



ULTRA HIGH-SPEED CAMERA may solve problem of chattering in fast cutting of steel. This is but one field involving high-speed industrial phenomena in which the new camera may prove of value in advanced research.

CERMETS

may answer JET DESIGNERS' PRAYERS

Part II

by W. J. Koshuba*

and

J. A. Stavrolakis*

Aircraft Gas Turbine Dept.
General Electric Co.
Oak Ridge, Tenn.

Detailed information on cermet properties is still scarce. While wear resistance, general high-temperature behavior and strength-to-weight ratio is good, cermets are less shock resistant, less ductile, and costly to produce. These new materials are likely to see service in rockets, thermocouple protection tubes, induction heating coils and electronic cathodes.

There is a paucity of information with regard to the mechanical and physical properties of cermet compositions.

The Kennametal, Inc., laboratories have made exploratory studies of titanium carbide (TiC) base metal-ceramic and have reported data on combinations of TiC with cobalt, nickel, tantalum carbide (TaC) and columbium carbide (CbC). Creep tests at 1600°F on TiC-20 pct nickel (K 151A) with undisclosed amounts of TaC and CbC reveal creep rates of 0.0015 pct per hr at 12,110 psi.³ This compares favorably with cast X-40, a cobalt base alloy containing 25 pct Cr, 10 pct nickel and 2 pct tungsten. The creep rate of this alloy is .001 pct per hr at 1600°F at 14,000 psi.⁴

Table I is a resume of some of the test information available on TiC base cermets produced by Kennametal. Table II is a compilation of the work done at Ohio State University on cermets of the same category.⁵ Fig. 6 is a

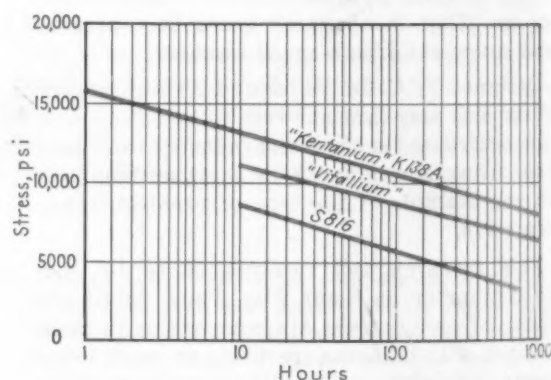


FIG. 6—Comparison of stress rupture properties of a titanium carbide composite and two well-known alloys.

graphical comparison of the stress rupture properties of a TiC composite ("Kentanium," K 138A) with two well-known high-temperature alloys. Some of the additions to TiC have

* The work described in this article was done by the authors while employed in the Nuclear Energy Production Administration, Fairchild Engine & Airplane Corp., Oak Ridge, Tenn.

TABLE I
PROPERTIES OF KENNAMETAL TITANIUM COMPOSITIONS

Grade and Composition	Transverse Rupture Strength, Room Temp., psi	Transverse Rupture Strength, 1800°F, psi	Tensile Strength, psi	Compressive Strength, Room Temp., psi	Young's Modulus of Elasticity, Room Temp., 10 ⁻⁴ psi	Hardness, Ra	Specific Gravity	Thermal Expansion, 100° to 1200°F, 10 ⁻⁴ per °F	Thermal Conductivity, Btu/hr/ft ² /°F/ft	Electrical Conductivity, pct of Cu Standard	Characteristics
(K138) TiC 80% Co 20%	175,000	100,000	room temp-85,000 1760°F-45,000 2200°F-15,000	550,000	55.0	90.5	5.5	5.0	20.6	5.0	Straight titanium carbide type.
(K138A) TiC 80% TaC CbC Co 20%	150,000	100,000	1500°F-45,000 1760°F-35,000 2000°F-40,000		57.3	89.5	5.8	4.5	18.2	4.0	High oxidation resistance type.
(K139A) TiC 95% TaC CbC Co 5%	112,000				51.2	93.0	5.4				High oxidation resistance type. Highest softening temp. Lowest shock resistance.
(K140A) TiC 90% TaC CbC Co 10%	135,000				53.2	91.5	5.6			1.0	High oxidation resistant type. Medium softening temp. Medium shock resistance.
(K141A) TiC 70% TaC CbC Co 30%	190,000				54.3	87.5	6.0	4.7			High oxidation resistant type. Lowest softening temp. Highest shock resistance.
(K150A) TiC 90% TaC CbC Ni 10%					52.7		5.6				Same as K140A plus resistance to attack by aluminum and glass.
(K151A) TiC 80% TaC CbC Ni 20%	150,000		2000°F-40,000		56.7	89.0	5.8				Same as K138A plus resistance to attack by aluminum and glass.
(K152B) TiC 70% TaC CbC Ni 30%	180,000-190,000										

TABLE II
PROPERTIES OF TiC-BASE METAL CERAMICS*

Composition	Apparent Porosity, pct	Absorption, pct	Oxidation 100 hr at 2000°F, oz/in. ²	Modulus of Rupture, psi		Firing Shrinkage, pct
				75°F	1800°F	
90 pct TiC-10 pct Cr	0.375	0.067	0.0048	60,000	31,600	15.2
70 pct TiC-30 pct Cr	6.96	1.28	0.00197	30,500	44,300	9.6
90 pct TiC-10 pct Fe	0.205	0.037	0.0105	67,000	58,000	15.6
70 pct TiC-30 pct Fe	0.406	0.070	0.0124	85,000	47,000	14.8
90 pct TiC-10 pct NiAl	0.653	0.137	0.00744	39,000	72,000	12.2
70 pct TiC-30 pct NiAl	0.142	0.027	0.00583	72,000	34,000	12.0
90 pct TiC-10 pct 50-50 ferrosilicon	0.675	0.137	0.00573	30,000	44,000	12.3
70 pct TiC-30 pct 50-50 ferrosilicon	2.98	0.605	0.00349	22,000	34,000	8.9
90 pct TiC-10 pct Duriron	0.111	0.021	0.00715	58,000	49,500	14.8

* Compilation of work at Ohio State University.

been chromium, iron, nickel, aluminum, "Duriron," and ferrosilicon.

J. D. Roach⁶ of National Lead Co. has noted that chromium additions to recrystallized TiC improves its resistance to oxidation. An addition of 5 pct chromium appeared to provide maximum protection at temperatures of 1200°F,

1560°F, and 2550°F. However, no independent confirmation of this has been made to the authors' knowledge.

According to Redmond,¹ the oxidation resistance of TiC-20 pct cobalt can be materially improved by additions. These additives are TaC and CbC. The increase of oxidation resistance

by a factor of 40, as reported by Redmond, is difficult to explain. However, the National Advisory Committee for Aeronautics has tested blades of this material in a supercharger for a period of 110 hr at a gas inlet temperature of 2200°F. The blade temperature, in this case, probably did not exceed 2000°F.

The results of this test are superior to an earlier one when approximately 14 hr of operation were realized on a TiC-20 pct cobalt turbine blading. This clearly indicates superiority of the latter development. Whether this is due primarily to compositional differences or to better techniques in fabricating the materials is not known.

Metal-ceramics such as chromium alumina ($\text{Cr-Al}_2\text{O}_3$) have been tested extensively at Ohio State University.⁷ This has made available considerable information on many of the properties of the 30 pct chromium-70 pct Al_2O_3 compositions as shown in the summary of Table III. Table IV presents data on mechanical properties to 2400°F, with bending and in tension. Only a slight difference is found between the bodies heat treated for 25 hr at 2500°F and the "as-sintered" bodies. It is impossible, of course, to compare these properties with those of high-temperature alloys in current use, as most of the alloys are in the liquid or near liquid phase at 2400°F. Fig. 7 illustrates the stress rupture properties of this cermet at different temperatures.

Haynes-Stellite has also investigated $\text{Cr-Al}_2\text{O}_3$ metal-ceramics.⁸ The composition on which considerable data has been accumulated is in the high chromium range ("Metamic," LT-1). Table V summarizes the available data on this material with a comparison of other high-temperature materials.

In an attempt to make $\text{Fe-Al}_2\text{O}_3$ bodies, Ohio

TABLE III
PHYSICAL PROPERTIES,
30 PCT Cr—70 PCT Al_2O_3 *

Firing Shrinkage—A12G	13.0 pct
A12H	14.5 pct
Apparent Porosity	Less than 0.5 pct
Apparent Specific Gravity	4.60 — 4.65
True Specific Gravity	4.68 — 4.72
Bending Strength at 75° F.	55,000 psi
Tensile Strength at 75° F.	35,000 psi
Compressive Strength at 75° F.	320,000 psi
Modulus of Elasticity at 75° F.	5.23×10^7
Impact Resistance at 75° F.	1.05 in lbs.
	18.95 in lbs./sq in. of area
Thermal Expansion	(77° F. — 1472° F.) 4.8×10^{-6}
Heat Transfer	Slightly less than sintered alumina
Thermal Conductivity†	$66.5 \pm 20\%$ Btu./hr/sq ft — in./° F.
Resistance to Thermal Shock	Good
10 Cycles at 2400° F.	15 pct to 50 pct gain
Resistance to Oxidation	Excellent up to 2750° F.
Hardness	1100 to 1200 Vpn

* Ohio State University.

† Determined in laboratories of A. C. Spark Plug Co., Flint, Mich.

TABLE IV

STRENGTH OF 30 PCT Cr—70 PCT Al_2O_3 RODS*

Temp., ° F.	Stress, psi		Average, psi	
	Tension	Bending	Tension	Bending
75	38,500	55,300	34,700	53,480
	32,900	51,600		
1600	22,500	37,850	19,550	33,480
	18,150	30,800		
	18,000	32,000		
1800	23,850	34,300	20,833	33,970
	18,600	31,650		
	22,050	33,250		
2000	20,050	31,850	18,490	28,170
	18,720	27,400		
	18,700	25,250		
2200	20,450	33,450	18,283	28,260
	18,780	24,000		
	17,620	27,400		
2400	14,120	22,600	14,120	22,600

Heat Treated 25 Hours at 2500° F.

75	27,700	59,200	33,100	62,930
	38,500	66,500		
1600	26,550	39,300	26,425	38,675
	26,300	32,850		
1800	19,200	30,350	18,290	32,725
	17,380	35,100		
2000	19,850	27,520	19,240	27,980
	18,630	27,600		
2200	16,500	26,100	15,400	23,700
	14,300	25,400		
2400	13,520	22,600	13,520	22,600

* Ohio State University.

State admixed 30 pct carbonyl iron with Al_2O_3 .⁹ The results are reported in Table VI. This was a cursory examination of the combination with no serious effort made to achieve maximum properties. It is most probable that these properties would be materially affected by a systematic investigation of the combinations.

NACA¹⁰ has made a study of the properties of a boron carbide-13 pct iron cermet. The information is sparse and gives no indication of the merits of the system, Table VII.

Mechanical data have been obtained on a magnesia-titanium, nitride-nickel oxide metalloid at Rutgers.¹¹ A number of variations in composition have been investigated with varying degrees of success. The nickel oxide is reduced by sintering in part, to nickel which forms the metallic portion of the combination. This combination consists of 50 pct magnesium oxide, 30 pct titanium nitride and 20 pct nickel oxide. Preliminary studies yield the high temperature modulus of rupture data given in Table VIII. The apparent increase in strength has been attributed to the oxidation of the titanium nitride.

Bodies made up of beryllium-beryllium carbide ($\text{Be-Be}_2\text{C}$) have been investigated by utilizing several approaches to fabrication. These methods are cold pressing and sintering—with or without an extraneous bond—and hot pressing. The data are meager but the trend in property differences is very marked. See Table IX for tabulation of these results.

Hot-pressed material containing 35 pct beryllium by weight resulted in an apparent porosity of approximately 5 pct. Modulus of rupture values at room temperature for such

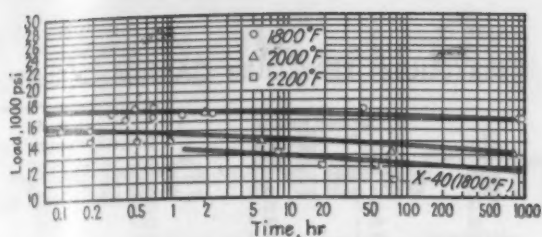


FIG. 7—Stress rupture properties of a 30 pct chromium-70 pct alumina cermet at different temperatures.

a composition average 35,000 psi and a compressive strength of 92,000 psi is obtained.¹² This would clearly indicate the difference in properties due to the fabrication technique involved.

The principal physical difference in the specimens is in the porosity of the bodies. The value of 35,000 psi exceeds the average modulus of rupture value of Be_2C by a factor of two.

The modulus of rupture of 28 pct beryllium-70 pct beryllium oxide (BeO) is approximately 35,000 psi and the compressive strength is 80,000 psi. The thermal expansion data for hot pressed $\text{Be-Be}_2\text{C}$ and Be-BeO specimens are given in Table X.

Raytheon¹³ investigated an obscure 80 pct oxide-20 pct molybdenum combination. They reported a compressive strength of 130,000 psi at room temperature with little decrease in strength to 3700°F.

Sindeband¹⁴ has reported some data on a mixture of 85 pct chromium boride-15 pct nickel. The room temperature modulus of rupture of

TABLE V

COMPARATIVE PROPERTIES OF $\text{Cr Al}_2 \text{O}_3$ MATERIAL

	"Metamic" LT-1 ($\text{Cr-Al}_2\text{O}_3$)	"Haynes Stellite" alloy No. 21	Cast iron	Pure sintered alumina
lb per cu in.	0.22	Density 0.30	0.26-0.29	0.15
°F	3362	Melting point 2547	2056-2500	3722
Mean coefficient of thermal expansion between 32° and 1832°F				
Per °F	4.7×10^{-6}	8.0×10^{-6}	6.2×10^{-6}	4.3×10^{-6}
Hardness, Rc	35	30	18-21	Shatters
Approximate bending strength (*) on short-time tests, psi				
77°F	80,000	†	90,000	40,000
1832°F	38,000	‡	Oxidizes	35,000
2552°F	18,000	Molten	Molten	15,000
Impact strength**:				
77°F, in.-lb	11	200	73	
Approximate limit of oxidation resistance in air				
°F	2182	2100		
Thermal Conductivity (at 800°F average temperature) Btu/hr/ft ² /°F/ft				
	29.1††	8.23	26.8	1.7
Electrical Resistivity (microhm-in., at 70°F):				
	34.3			$>3.937 \times 10^{10}$

* Modulus of rupture test bars, 0.1 x 0.25 x 1.5 in. (1-in. span).

† Bend test is ordinarily not applied to ductile materials like "Haynes Stellite" alloy No. 21.

** ASTM ceramic test No. D-667-44, Charpy test on 1/2-in. diam unnotched cylinder, 4-in. centers.

†† Pure chromium thermal conductivity 33.9 Btu.

TABLE VI

CARBONYL IRON—ALUMINA MIXTURE

Firing Temp., °F	Linear Shrinkage, pct	Approx. Porosity, pct	Compressive Strength, psi
2500	0.55	52.3	1175
2800	3.58	45.6	4110
3000	7.03	44.6	9200

TABLE VII

BORON CARBIDE—13 PCT IRON MIXTURE

Temp., °F	Mod. of Rupture, psi	Density, lb per cu in.
75	39,100	.119
1800	32,000	.115
2000	30,000	.117
2400	28,600	.118
2800	23,400	.114

such a composition is 120,000 psi. Fig. 8 illustrates Sindeband's comparison of the stress rupture properties of this mixture with cast "Vitalium." It is noted that the rupture values are considerably lower than for cast Vitalium. This lower strength may be caused by the formation of a less refractory nickel boride liquid phase at 1900°F. It was previously pointed out that there is some feeling that the nickel borides are chemically unstable, and these data do not contradict the theory.

A number of laboratories have been interested in silicon-silicon carbide (Si-SiC) combinations for high temperature applications.¹⁵ Silicon-infiltrated SiC skeletons exhibit a bending rupture strength of 33,000 psi at 2408°F

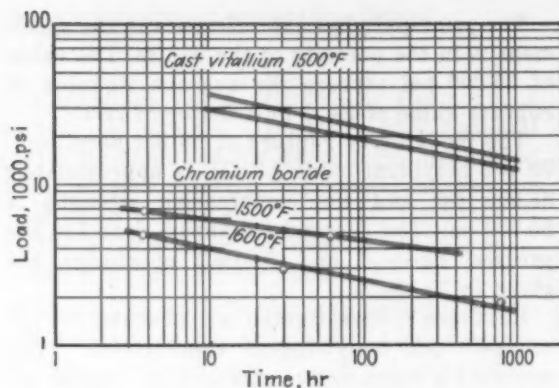


FIG. 8—Comparison of stress rupture properties of an 85 pct chromium boride-15 pct nickel mixture with those of cast Vitallium.

Cermets may answer prayers (continued)

and a tensile strength of 60,000 psi at the low temperature of 1472°F.

The largest potential use of cermets is in the manufacture of jet engine components. The resistance to elevated temperatures and improved thermal shock over ceramic materials should make these materials useful for this application. Another possibility is the fabrication of rocket nozzles and directional fins. For gas turbine combustion chambers, cermets may be used to form the burner cones which are water cooled at the present time with inadequate results.

Thermocouple protection tubes which would be resistant to both metal baths and thermal shock may be fabricated from cermet composites. In the induction-heating field, it is possible to use cermets for the induction coils eliminating water cooling. Abrasive conditions at elevated temperatures offer cermets another very strong possibility of application. Many other uses of metal-ceramic combinations are waiting for the engineer with imagination. An outstanding example of this is the application of cermets as cathodes in the electronic industry.

It should be emphasized that there is a great deal of fundamental research to be accomplished in the metal-ceramic field. Also, some cermets still require large amounts of strategic materials. The physical and mechanical properties are literally unknown at the present.

TABLE VIII
MIXTURE OF 50 PCT MgO ,
30 PCT TiN , 20 PCT NiO

Temperature, °F	Mod. of Rupture, psi
1500	19,900
1800	20,500
2000	33,000
2200	30,400
2400	30,900

TABLE IX

BERYLLIUM-BERYLLIUM CARBIDE CERMET*

Be Content, pct	Apparent Porosity Phenol Resin		Compound Strength	
	Bond, pct	No Bond, pct	Bond, pct	No Bond, pct
10	39.4	41.8	1360	3670
15	41.0	38.5	2290	4840
20	40.4	40.4	2200	3180
25	42.5	39.4	1580	3470
30	40.6	41.4	1630	4170

* Fabrication process: cold-pressed and sintered.

TABLE X

PROPERTIES OF TWO BERYLLIUM COMPOUNDS

Composition	Mean Coef. of Expansion (in./in.) °F × 10 ⁻⁶			
	70-500 °F	70-1000 °F	70-1800 °F	70-2000 °F
65 Be:C — 35 Be	5.2	7.0	8.1	8.7
72 Be:C — 28 Be	3.9	5.7	6.4	7.3

References

- Redmond, J. C., and Smith, E. N., "Cemented Titanium Carbides," American Society for Metals Transactions, p. 185, 1947.
- Blackburn, A. R., and Shevlin, T. S., "Progress Report on Fabrication and Physical Properties of 30 pct Cr-70 pct Al_2O_3 Cermets," Air Material Command. Report No. 53, Ohio State University, April, 1949.
- "Private Communications," Kennametal, Inc., Latrobe, Pa., Aug., 1950.
- Sweeney, W. O., "Haynes Alloys for High Temperature Service," Transactions American Society of Mechanical Engineers, p. 69, 1947.
- Shevlin, T. S., and McBride, C. C., "Titanium-Carbide-Base Cermets," AMC Project Report No. 59, Ohio State University, Jan., 1950.
- "Private Communication," National Lead Co., New York.
- Shevlin, T. S., and Zartman, W. S., "Stress Rupture Properties of 30 pct Cr-70 pct Al_2O_3 Cermets," Final Report—AMC Project Report No. 60, Ohio State University, May, 1950.
- "Metamic, Metal Ceramics," Catalog, Haynes Stellite Div., Union Carbide and Carbon Corp., Kokomo, Ind.
- Shevlin, T. S., "Wetting of Alumina by Selected Metals as Applied to Cermets," AMC Project Report No. 34, Ohio State University, Dec., 1947.
- Lidman, W. G., and Hamjian, H. J., "Properties of Boron Carbide—Aron Ceram," NACA Technical Note No. 2050, Mar., 1950.
- Londeree, J. W., "Annual Progress Report on Ceramic Metalloid—Metal Bodies," AMC Project Annual Report No. 1, Rutgers University, Oct., 1949.
- "Private Communication," NEPA Laboratories, Oak Ridge, Tenn.
- "Private Communication," Raytheon Laboratories, Waltham, Mass.
- Sindeband, S. J., "Properties of Chromium Boride and Sintered Chromium Boride," Transactions of AIME, p. 185, 1949.
- Frechette, V. D., "Phase Relationships Between Metals and Ceramic Oxides Under Oxidizing Conditions at High Temperatures," Conference on Ceramic Materials for Application to Aircraft Power Plants at AMC, Wright-Patterson Field, Alfred University, Dayton, May, 1948.

Part I of this series appeared in last week's issue.

Toxic Metals Cause New Industrial DISEASE PROBLEMS



By Dr. W. Schweisheimer
Highland Hall
Rye, N. Y.

Wider use of rare metals, which only a few years ago were laboratory curiosities, has brought industry new health problems. Diseases of the heart and blood vessels increase as the general age level of the working population increases. Welding radiation does not cause sterility. New burn treatments are effective, help speed recovery.

Many metals, which a few years ago were laboratory curiosities, have suddenly assumed important roles in industry. Workers are often subjected to the dust and fumes of toxic metals and the gases of metallic compounds. As a result, new industrial diseases are being encountered.

Beryllium poisoning, lung cancer from long exposure to chromium, and diseases caused by radioactive isotopes have been recognized as three new diseases.¹ Beryllium may cause skin lesions and particularly affects the respiratory tract, with effects ranging from mild sore throat to severe pneumonia. Beryllium poisoning occurs where the metal or its salts contaminate the air.²

No poisoning has occurred from mere handling of beryllium-copper alloys used in nonsparking tools or springs.

The amount of beryllium necessary to produce the disease is still unknown. A study indicates acute pneumonitis will not occur if concentrations of beryllium are kept below 25 microgram per cu meter of air.³

Early report of respiratory disturbances is important. Rest in bed, oxygen and symptomatic treatments are the generally recognized therapeutic measures. Several drugs and hormones are being tried. Persons having occupational con-

tact with beryllium should be warned of the potential dangers and instructed in methods of protecting their health.

There has been increased exposure to the dust of cobalt. Toxicity by mouth is considered low.⁴ It has caused blood disturbances (polycythemia) in animals. Powdered cobalt produces dermatitis and inflammation of the skin.⁵

Selenium, toxic in certain combinations, may be ingested, inhaled or absorbed through the skin. Its compounds are transformed in the body into dimethyl selenium which causes a garlic-like odor of breath and perspiration. Symptoms of selenosis are nausea, vomiting, metallic taste in the mouth, dizziness and extreme lassitude. Inhalation may produce cough and other respiratory disturbances.⁶

Tellurium, thallium and vanadium are believed to have effects similar to those of selenium. Thallium, in addition, makes hair fall out.

In the production of ferro-vanadium, the pentoxide V_2O_5 is generally used. Its dust, inhaled, causes a relatively mild occupational disease. Occasionally there is an acute irritation of the respiratory tract, sometimes attended by pneumonia (vanadium pneumonitis).⁷

Copper and lead refiners and workers who color

glass are exposed to hazards from tellurium. Moderate exposure to the fumes and dust of tellurium for a few weeks or months causes a metallic taste in the mouth, inhibition of sweat, and a scaliness and itching of the skin. Other signs of tellurium poisoning are drowsiness and a garlic-like odor of the breath.⁸

Cadmium is one of the more toxic metals. Poisoning is usually by inhalation. Dust or fumes are produced by grinding, burning or welding of cadmium-plated metals, cadmium alloys and metals covered with cadmium-bearing paint. Dryness of the throat, cough, headache, vomiting and a sense of constriction of the chest are first signs. Severe lung damage shows itself hours after exposure. The American Standards Assn. has accepted a maximum of 1 mg. of cadmium in 10 cu m of air.⁹

Calcium gluconate helpful

Workers in a French factory making ferro-nickel storage batteries, the negative electrode of which was cadmium hydroxide, were studied. The first symptom of poisoning is a yellow ring on the teeth. For prophylaxis, when the ring develops, injections of calcium gluconate should be given every 4 months. Each person works on cadmium for 6 months only and gets calcium gluconate from the beginning.¹⁰

Of 19 Swedish workmen exposed to cadmium and nickel dust for more than 8 years, excretion of protein in the urine was found in 18 cases. No proteinuria was found among 19 patients exposed only a year or two.¹¹

Columbium, important as an alloy, has not been reported to have poisonous effects. Tantalum also is not poisonous. It is used in surgery, making of sutures and skull plates. Industrially it is used in cemented tungsten carbide.

Platinum has generally been considered harmless and there have been no cases due to dust exposure. Skin lesions after contact with platinum oxide, and asthmatic symptoms are not uncommon among workers exposed to the platinum salts.

DO YOU USE THESE METALS IN YOUR PLANT?

Many have toxic effects on workers.

Metal	Toxic?
Beryllium	Yes
Cadmium	Yes
Chromium	Yes
Cobalt	Yes
Columbium	No
Indium	Unknown
Osmium	Yes
Platinum	No
Selenium	Yes
Tantalum	No
Tellurium	Yes
Thallium	Yes
Vanadium	Yes

Indium is apparently not an important poisoning metal in industry.

Osmium tetroxide has been acknowledged dangerous, but there are few individual exposures. Acute eye effects and irritation of the respiratory organs have been noted. Symptoms usually stop within 24 hr and no chronic effects have been noted.¹² Osmium is used in making platinum alloys for scientific apparatus, with iridium for tipping fountain pens, and for tipping tools used to engrave glass. Prevention means proper ventilation of workrooms where tetroxide fumes are present.

Metallic poisoning is best treated by complete removal from exposure to the metal. All these metals are cumulative in the body. A lower level of exposure is harmless only to someone who has not yet accumulated poisonous amounts of the metal. When respiratory disturbances occur as in beryllium, cadmium or selenium poisoning, oxygen will often help tide the patient over severe phases of the disease. The best control of metal poisoning lies in prevention of excessive exposures.

A remarkable case of occupational burns had a happy ending recently in Denver, Colo. A steelworker, Benny Fernandez, received second and third degree burns of the neck and face after a cauldron of molten iron at 2700°F blew up in his face.

Thanks to safety glasses, his eyes were unharmed. Thanks to his rugged constitution he quickly recovered from the extremely severe burns. The burns were thoroughly cleaned with soap and water. A solution made up of compound tincture benzoin, 8 oz., iodoform powder, 5 gm. was applied.¹³

New burn treatments effective

Colorado Fuel and Iron Corp. made this treatment for burns routine during the past 2 years. They have eliminated much infection which is the natural consequence of any burn. The compound tincture of benzoin is an alcoholic solution of a balsamic resin. It dries, leaving a coating over the burn which protects it and relieves pain to a great extent.

A young man was recently burned by gasoline over 71 pct of his body. Medical experience shows that those who are burned over more than 50 pct of the body, usually do not survive.

Dr. James Whitelaw in Phoenix, Ariz., gave him ACTH. This hormone of the pituitary gland stimulated the adrenal gland to manufacture cortisone. Immediately shock and pain disappeared. The burns began to heal. Skin grafts quickly "took" over sites of the burns, and new skin grew quickly.¹⁴

Heart disease and disorders of the blood vessels, conditions of advanced years, are bound to increase in frequency from year to year. People live longer today, and consequently will get one of the diseases of higher age such as heart disease, arteriosclerosis, cancer, diabetes or arth-

ritis. Life expectancy has doubled in the past 70 years!

Many steel plant jobs are unsuitable for employees with heart disease. Bethlehem Steel Co.'s Dr. Lawrence T. Smyth recently undertook a more thorough medical examination to discover such cases.¹⁵

A steel mill employee suffered from high blood pressure, associated with advanced changes in the retina, the nervous background of the eye, and with kidney disorders.

Nobody was aware that the man was suffering from such severe changes in his blood vessels, not even he himself. So it was not surprising that he was found operating a locomotive to transport molten metal. An accident might have had disastrous results.

Of nearly 400 cases of heart disease discovered, it was necessary to transfer only nine to more suitable employment. In 80 cases, permanent restrictions were imposed, the most common relating to climbing, strenuous effort, and operation of machinery.

Older employees deserve opportunity

Temporary restrictions regulating hours and type of work were imposed in 21 cases.

Dr. Smyth emphasizes that men grow old on the job. They develop disabling defects though they remain on a job for which they have ceased to be physically qualified. Such experienced workers deserve an opportunity to continue in satisfying employment, but to do so without harmful consequences. Many employees in steel plants with heart disease, he says, are still undetected, and that means harm to them.

Industrial physicians can prolong the useful life and comfort of many steel industry workers who have heart disease. They should carefully outline to patient and employer the work capacity of the patient with heart disease. Employer and physician should remember that the patient has a family and that he can usually be placed on a useful job. His abilities and skill should be utilized up to his capacity. After a work program has been established, these cardinals become loyal

and dependable workmen. Their absentee rate is low.¹⁶

Most heart disorders in Dr. Smyth's report on the steel industry were coronary diseases. The coronary arteries feed the heart muscle itself.

People with a coronary condition have to watch their everyday life. Drs. E. Levine and E. Philips, in a report on coronary attacks of Kaiser shipyard employees, stated that many workers who had such an experience, were able to resume full activity without recurrence of any symptoms. Some had to be assigned to light tasks or sedentary work, while others were capable of manual labor. Frequency of complications was the same whether the workers who recovered, resumed work or not.

Patients who show steady improvement should be returned to useful positions, says Drs. Levine and Philips. Medical supervision is necessary. As a matter of common sense the worker should not be placed in a position in which sudden failure of one man would endanger the lives and safety of others, or would cause harm to himself.

During the last few years, there has been talk that the activity of welding produces sterility, particularly in women.

Welders are exposed to intra-red and ultraviolet rays. These rays cannot produce sterility. The belief that welding causes sterility has arisen by confusion of the effects of infrared and ultraviolet radiations with X-rays and gamma-rays from radium. Overexposure to the latter may lead to sterility. These rays are not present in the welding process.¹⁷

British steel workers studied

Lung diseases of iron and steel foundry workers have been examined carefully in studies on dust and silicosis. An extensive British study on industrial lung diseases of iron and steel foundry workers was recently made.¹⁸

Among steel foundry workers X-rayed, more lung changes were seen than among workers in iron or mixed iron and steel foundries. Lung changes were also more frequent in the cleaning of steel castings than in the other foundry work.

References

Literature to: New Problems of Industrial Hygiene in Iron and Steel Industry.

¹ Leonard Greenburg, "Diagnosis and Treatment of Occupational Metal Poisoning," *Jl. of American Medical Assn.* 139, 1949, p. 815.

² James H. Sterner and Merrill Eisenbud, "Epidemiology of Beryllium Intoxication," *Archives of Industrial Hygiene* 4, 1951, p. 123.

³ Irving R. Tabershaw, Cyril Dustan and Leonard J. Goldwater, "Medical Control of Beryllium Poisoning," *Jl. Industrial Hygiene*, 1949, p. 227.

⁴ Lawrence T. Fairhall, *Brit. Jl. Industrial Medicine* 3, 1946, p. 207.

⁵ Schwartz, Tulpan and Peck, "Occupational Diseases of the Skin," Philadelphia, 1947.

⁶ R. F. Buchan, "Industrial Selenosis," *Jl. Industrial Hygiene*, 1948, p. 10.

⁷ Sven-Gosta Sjöberg, "Health Hazards in the Production and Handling of Vanadium Pentoxide," *Archives Industrial Hygiene*, 1951, p. 431.

⁸ Shee and Deeds, "The Importance of Tellurium as a Health Hazard in Industry," Washington 1920, reprint.

⁹ Lawrence H. Cotter and B. H. Cotter, "Cadmium poisoning

Archives of Industrial Hygiene, 3, 1951, p. 495.

¹⁰ P. Barthelemy and R. Moline, "Cadmium Poisoning," *Jl. Industrial Hygiene*, 1947, p. 123.

¹¹ Friberg, "Proteinuria and Kidney Injury among Workmen Exposed to Cadmium and Nickel Dust," *Jl. Industrial Hygiene*, 1948, p. 32.

¹² A. I. G. McLaughlin, R. Millett and K. M. A. Perry, "Toxic Manifestations of Osmium Tetroxide," *Brit. Jl. Indus. Med.*, 3, 1946, p. 183.

¹³ J. T. Barwick, Medical Staff of Colorado Fuel and Iron Corp. Personal Information.

¹⁴ H. A. Rusk, "New Treatment for Burns," *New York Times*, Dec. 31, 1950.

¹⁵ Lawrence T. Smyth, "Cardiovascular Disease in the Steel Industry," *Industrial Medicine and Surgery* 20, 1951, p. 34.

¹⁶ W. H. Rice, "Management of Heart Disease in the Steel Industry," *Southern Medical Jl.* 43, 1950, p. 553.

¹⁷ A. C. Stern, "Welding and Sterility," *Div. Industrial Hygiene*, New York Dept. of Labor, 1950.

¹⁸ A. I. G. McLaughlin and Associates, "Industrial Lung Diseases of Iron and Steel Foundry Workers," London 1950.

RARE EARTHS Improve forgeability of stainless

By C. B. Post, D. G. Schoffstall
and H. O. Beaver

Carpenter Steel Co.
Reading, Pa.

This field is one of the most important developments in basic steel-making in recent years. Carpenter's application of rare earth to stainless is a noteworthy advancement to the practice. Stainless steels not commercially available before can now be hot-worked.

One of the problems of producing certain stainless steels has been the difficulty of hot-working the metal. Consistently malleable ingots in particular have long been needed in certain types of stainless. Lack of an easily wrought material has in cases restricted the availability and increased the cost of producing these steels.

For some years Carpenter Steel Co., Reading, Pa., has been investigating variables that affect hot-workability of stainless steels to improve the hot-workability of those steels where some measure of hot-workability presently exists. Also studies were made to impart hot-workability to stainless alloys previously non-hot workable.

The rare-earth elements are an effective agent in promoting and improving the hot-workability of austenitic chromium-nickel and high alloyed stainless steels when added as an alloying element. The rare-earths are effective in improving the hot-workability of austenitic, or partly austenitic grades of stainless steels containing 4 to 70 pct Ni, and 10 to 60 pct of elements from the group of chromium, molybdenum and tungsten, the amount of any one element of the group of chromium, molybdenum and tungsten not to exceed 30 pct.

The effect of this alloy agent can be exceptionally marked in some alloys where the metal is converted into a commercial wrought product from a metal previously considered to be non-hot workable. In other metals, the effect will be to improve the existing hot-workability as evidenced by better ingot-to-billet yields, less billet preparation, and better-hot-rolled strip surfaces.

The term rare-earth elements refers principally to cerium, lanthanum and those other rare-earth metals commonly associated in mischmetal.

Alloy additions of cerium and lanthanum in the range of about 0.02 to 0.04 pct are effective in promoting better hot-workability in high-frequency Ajax and basic electric arc melted alloys such as Type 316, 310, 308, etc. Alloy additions of cerium and lanthanum in the range of 0.08 to 0.18 pct are effective in achieving hot-workability in such alloys as Carpenter #20 (nickel-chromium-molybdenum-copper) and other high alloyed stainless steels for corrosion resistance and high temperature strength.

In some grades of high alloyed steels a pronounced columnar structure is obtained in ingots. Some ingots show a fine grained equi-axed center condition, while others have large columnar grains. The ferritic grades, especially Type 430 or types where no transformation exists between the metal solidification point and room temperature, are prone to show the columnar type of grain structure. Ingot structures have been observed for a number of years in the austenitic types but it cannot be definitely claimed that the columnar type of structure causes any particular trouble in rolling or hammering, provided the alloy is ductile.

To isolate the hot-working variables so that an intelligent study could be made of this hot working problem, a special testing procedure was developed. The test is made using a chill cast structure so that the question of ingot structure

This article is an abstract of a technical paper to be presented at the Electric Furnace Conference, Iron and Steel Div., AIME, held this week in Pittsburgh.

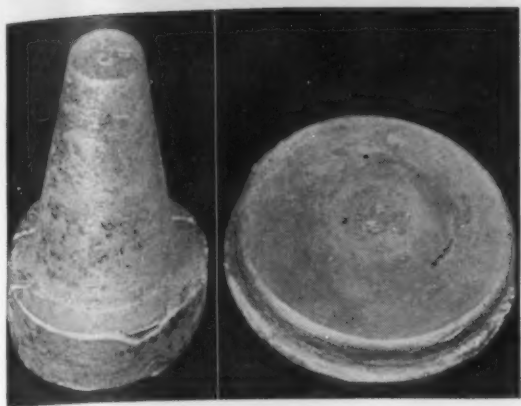


FIG. 1—The as-cast cone is shown at the left. The forged cone at the right is used as a measure of the workability of each particular steel grade.

is differentiated from the inherent hot-workability of the alloy. If the chill cast test shows the alloy to be ductile and ingots were not ductile, the trouble then lies in the ingot structure.

At Carpenter Steel Co., a cone test is used. One or more cone tests are cast with each heat of stainless steel under study. If not much is known of the steel, the cone test will lead to the correct rolling or forging temperature. This is determined by heating up the cones to various temperatures and forging them on a hammer, as shown in Fig. 1.

In the case of ferritic stainless alloys, cases have been found where the cone test will show the alloy to be ductile but ingots are almost completely non-ductile. Investigation on this effect has shown pronounced columnar grain sizes in the ingots with subsequent large grain sizes at the rolling temperatures. In the case of high-chromium steels such as 25 to 30 pct Cr, these large grains can cause the steel to be very notch brittle, even at rolling temperatures, so that scabs can initiate checks and cracks on the billet.

In austenitic stainless alloys, experience with the cone test has shown that if the ductility of the metal is satisfactory as measured by the cone test, then the metal will behave satisfactory in either rolling or hammering. In every case where the cone test showed an austenitic alloy to be ductile the ingots have also been ductile.

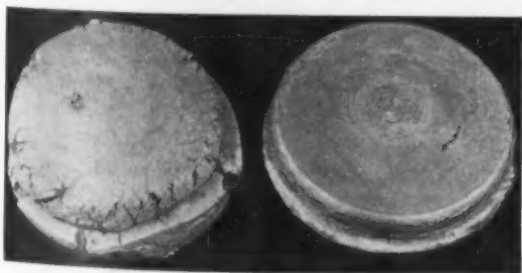


FIG. 2—Forged cones of stainless valve steel show effect of rare earth additions. The specimen on the left is 21-12 WN steel without mischmetal. Improved forgeability is evident in the sample at right.

The percentage yield from ingots to prepared billets ready for rolling is an important economic figure for steel mill operations. In the case of the 21-12WN valve steel, with 2 lb of misch metal alloy used per ton of steel, an average increase in prepared billet yields of about 15 pct over what had been obtained without the use of misch metal. Fig. 2 shows the forged cones of this steel with and without the misch metal.

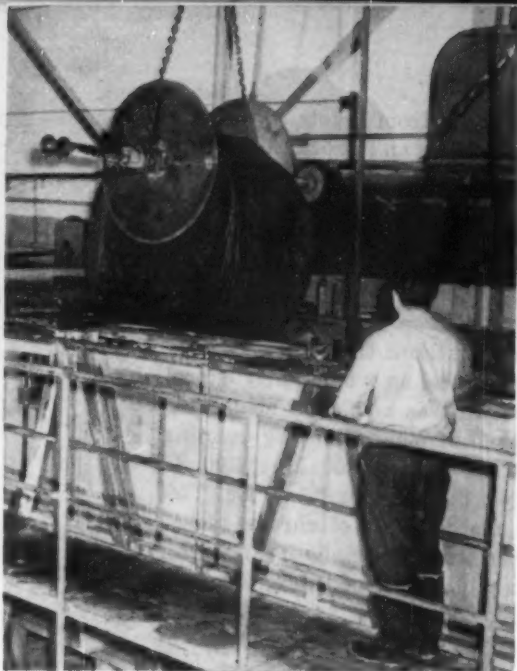
Another grade of steel on which early experiments were conducted was a sulfuric acid corrosion resistant steel of the following nominal composition: 0.10 (max) C; 2.00 Mn; 1.00 Si; 19.50 Cr; 23.00 Ni; 3.50 Mo; and 1.50 Cu. This steel was of the general class of chrome-nickel-molybdenum-copper steels especially designed for resisting sulfuric acid. Steels of this grade have been available for many years as castings, but attempts to hot-work steels into the form of wrought products have been unsuccessful.

Range of rare earths critical

At any given nickel content, the critical range of cerium and lanthanum necessary to achieve the best hot-working properties can be rather narrow. For instance, for 0.10 pct C (max), 30 pct Ni, 20 pct Cr, and 4 pct Mo with variable misch metal additions, the critical range of cerium and lanthanum is shown to be 0.06 to 0.49 pct Ce + lanthanum. Increasing the molybdenum content to 12 pct requires a more restricted range of cerium and lanthanum to achieve the best hot working properties. For an analysis of 0.10 pct C (max), 30 pct Ni, 20 pct Cr and 12 pct Mo when the critical range of cerium + lanthanum is shown to be 0.13 to 0.32 pct Ce + lanthanum.

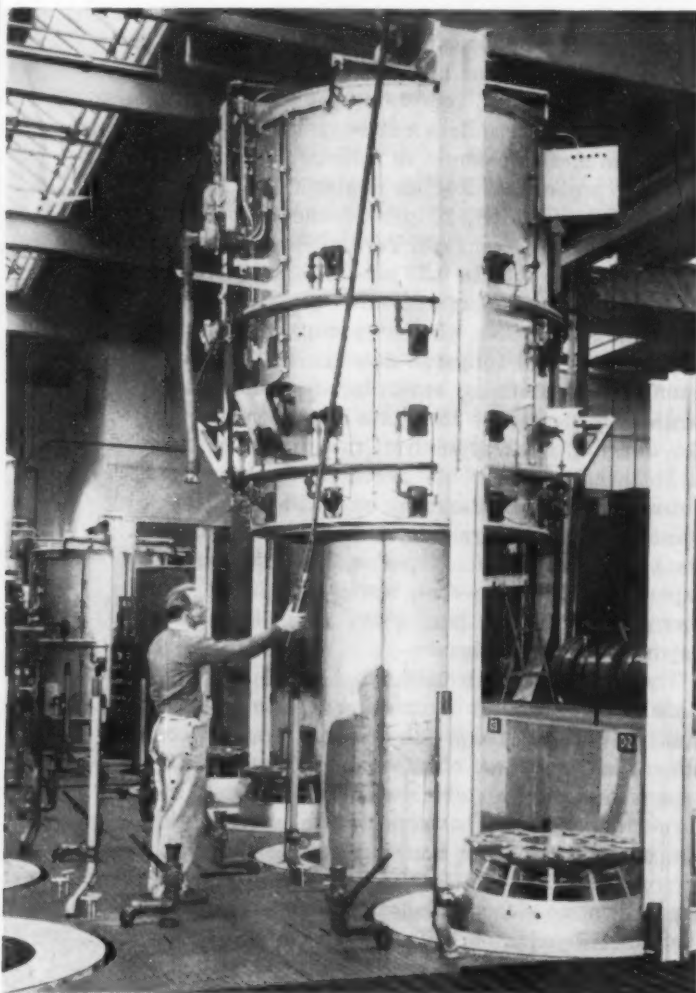
The nickel content of austenitic stainless steels containing elements of the group, chromium, molybdenum and tungsten determines the minimum and maximum amounts of cerium and lanthanum necessary to obtain improvements in hot-working. For any analysis the critical cerium and lanthanum contents necessary to improve hot-working can be narrower and will fall within these preferred ranges, depending on the analysis being considered. Experience or an actual experiment with the cone test will indicate the correct cerium and lanthanum range for best hot-working properties.

The exact mechanism of mischmetal (cerium, lanthanum, etc.) in promoting the hot-workability of these alloys has not yet been determined. In the course of experiments the various ranges of analyses which will be benefited by rare-earth additions have been established. While the concentration of rare-earths necessary to improve the hot-ductility of the various alloys are known, no clear explanation can be given of the exact deoxidation effects or benefits of the rare-earth additions. There appears to be little doubt that some of the benefits obtained are the result of a certain amount of deoxidation in the bath, which is accompanied by a marked increase in the fluidity of the modern metal.



HOT-ROLLED coils move from warehouse to scale breaker to pickling tank. Loosened coils revolve in reverse direction to winding so all surfaces receive proper treatment in pickling, neutralizing and rinsing tanks. Coils get hot air blast for quick even drying.

Warehouse Adds ROLLING, ANNEALING Facilities



TOP HAT is lowered onto base. Propane burners bring heat to proper degree for 14 hr annealing cycle. Cooling cycle requires 28 hr. After coils are soaked furnace lifts off.

Facilities for rolling, annealing and pickling steel strip, recently installed at the Evanston, Ill., warehouse of Korhumel-Heffron & Preiss Steel Co., will have a capacity of 2000 tons of cold-rolled strip per month.

When in operation, hot-rolled coils will be moved by crane from storage bays, through the scale breaker, to the pickling department, and then to the rolling facilities. The three stands of the two-high, 700 hp, tandem 16 in. unit reduce the steel strip up to 50 pct in thickness. The steel is re-coiled at the outlet and, if gage and temper are correct, moves onto a battery of 14 slitting machines.

Special annealing furnaces have been installed by Continental Industrial Engineers, Inc., for bright annealing, and heat treating where one or more mill pass is necessary for required temper.

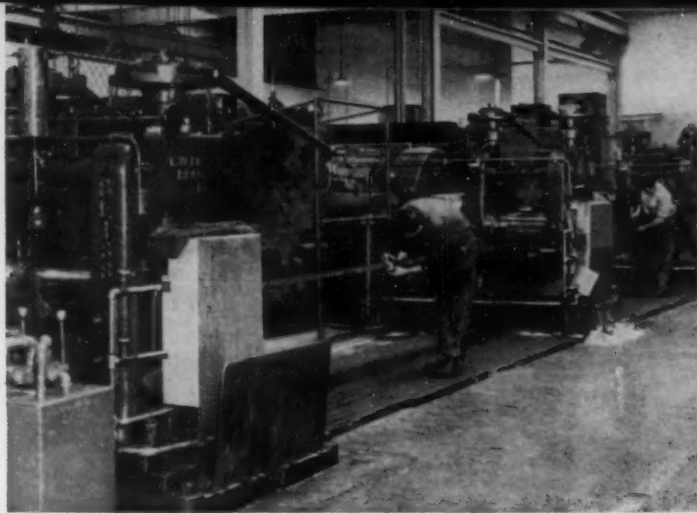
The equipment includes four "top-hat" refractory-lined annealing furnaces, 18 alloy inner hoods, and 16 alloy steel bases. When in operation, four bases will be used for loading, four for heating, four for cooling and four for unloading. The equipment occupies an area 23x60 ft.

In the loading operation, coils are set on the bases and covered with a hood. The hood is closed at the bottom with a water-cooled oil seal. A controlled gas atmosphere delivered into the hood insures clean, scale-free surfaces on the metal being processed.

The "top hat" furnace is lowered onto the base and the temperature within the furnace raised to the proper degree. Propane gas is used for fuel. The annealing cycle requires about 14 hr, and cooling about 28 hr. After the coils are



SLITTING MACHINE is one of battery of 14 which do custom slitting of steel strip at the Korhumel-Heffron & Preiss plant in Evanston, Ill.

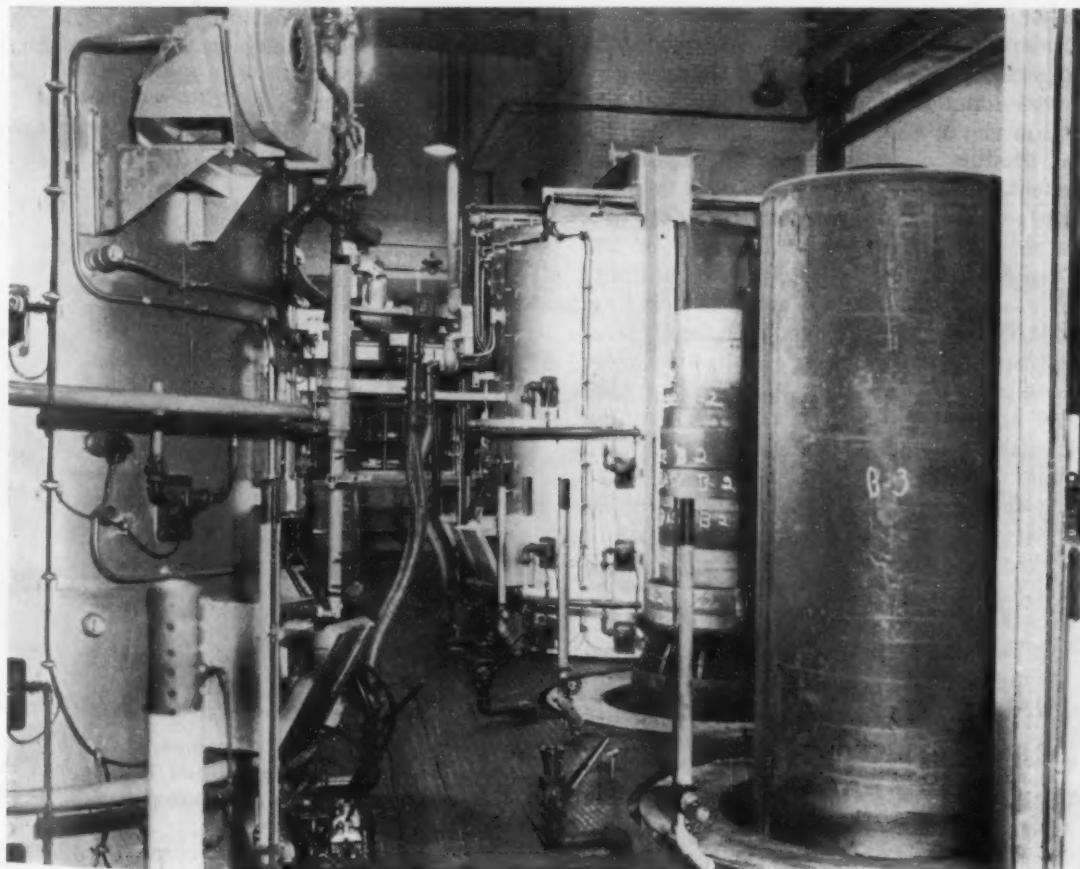


TWO-HIGH, 3-stand cold-rolling mill will reduce steel strip up to 50 pct in thickness. The tandem, 16 in. unit requires 700 hp and is electrically operated. Capacity is about 2000 tons per month when in full operation.

soaked the furnace is lifted off and lowered over another set of coils.

The annealed coils under the hood continue to receive inert gas until the temperature has dropped to about 500°F, depending on the type of steel being annealed. The gas for the hoods is scrubbed to remove moisture by passing through water heated coils in a vaporizer house.

STEEL COILS requiring heat treatment are stacked up on special piers. Hood, right, covers stock on pier. Controlled, inert gas atmosphere inside hood gives clean, scale-free metal surface.



Unique tools speed HYDRAULIC VALVE PRODUCTION



By B. N. Ashton
President
Electrol, Inc.
Kingston, N. Y.

* Unusual fixtures save time and labor in production and checking parts for hydraulic valves at Electrol, Inc. Setup on Warner & Swasey automatic produces 262 pieces per hr with fine finish and to close tolerances. Six-spindle machine speeds lapping of poppet valves. Fixtures simulate service conditions.

Production of parts for aircraft hydraulic systems is an exacting job. Close fits are essential to avoid leaks and insure precise operation. In some cases, unusual fixtures, some with micrometer adjustments, are needed to check performance against specifications.

Several unique fixtures and production setups are in use at Electrol, Inc., Kingston, N. Y., where production is centered on hydraulic equipment. A Warner & Swasey 5-spindle automatic produces aluminum spool-like parts in a single set of operations, at the rate of 262 pieces an hr. Unusually close dimensional limits are maintained and finish is equal to grinding.

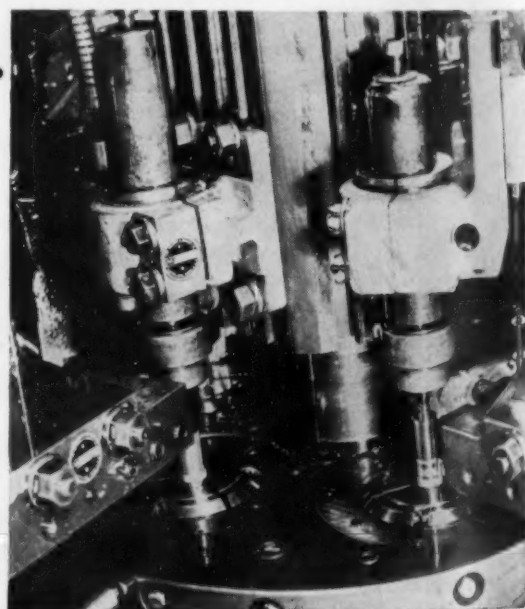
Formerly, this part was roughed in a turret lathe, after which the inner end had a center produced in an engine lathe. Finally the groove and OD at each end were ground on centers. Rates on these operations ranged from 12 to 15 pieces per hr. Ground surfaces required a 40 micro-inch finish. The screw machine, using high speed steel tools, and at a much higher production rate, holds this finish where specified.

A hollow fitting produced from aluminum bar stock on this machine has two internal undercuts besides several other close tolerance internal and some external operations. Finish is excellent. Production rate is 57 to 60 pieces per hr.

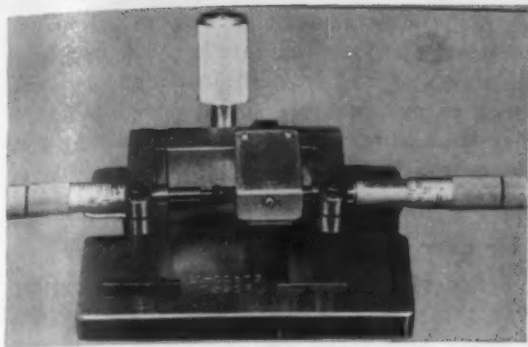
Poppet valve seats on many fittings have

only 0.0002 to 0.0003 in. face, yet must hold high pressures. Excellent lapping is needed. Poppet valve and seat are lapped together in a special 6-spindle fixture.

Each pair is placed in a recess under a



ALUMINUM SPOOL-LIKE parts produced on Warner & Swasey 5-spindle automatic are held to close finish and tolerance formerly obtained by grinding.



SLIDE VALVE motion from closed position is checked under hydraulic pressure in micrometer fixture. Tool is used with hydraulic system to simulate service conditions.

spindle. Coil springs, selected for light maximum pressure, press the poppets against the seats. Lapping is done with fine French rouge in oil, applied to each pair as loaded. Poppets are harder than the seats. Formerly, one pair of parts was lapped at a time. After lapping, each pair is checked for ability to hold a given pressure in a setup simulating service conditions.

Many hydraulic valves are of the slide type. Some must meet requirements for motion, specified in thousandths of an inch, before a leak, corresponding to the start of valve opening, occurs.

A micrometer fixture was designed to test these valves. A fitting connects to a hydraulic line, carrying a specified pressure. A gage indicates pressure drop when the valves open.

In line with the slide are the barrels of two micrometers. One is used to set the slide to a given closed position and the other to contact the other end of the slide. Then the first is backed off and the slide is moved longitudi-

nally by the second micrometer until the gage shows that the valve has opened.

The precise amount of motion is measured by initial and final readings of the micrometer that moved the advance slide.

Other slide valves have a mechanism that is rocked to produce motion of the slide. Specifications require a certain number of degrees of motion to open the valve from a given initial setting.

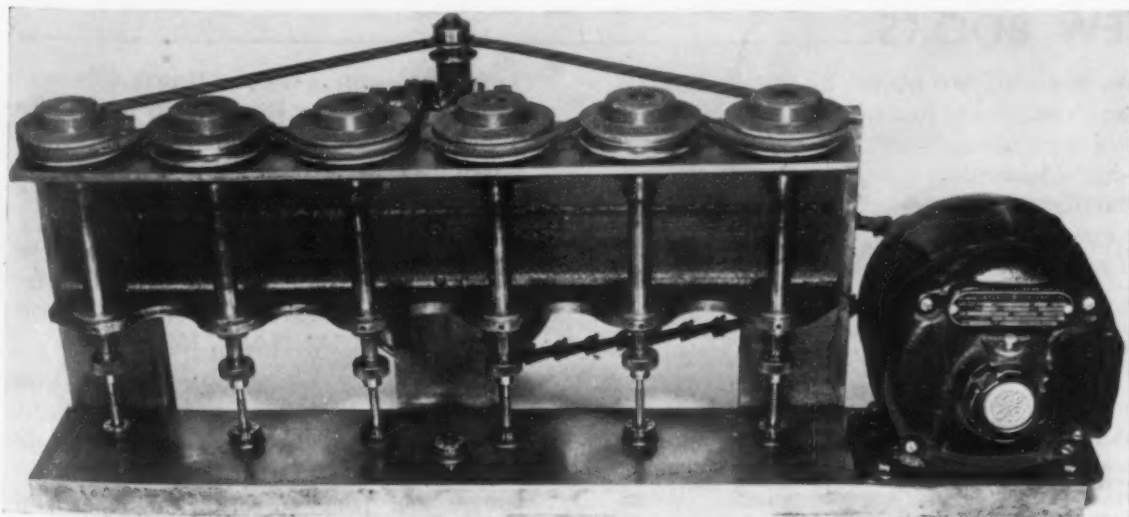
A valve is locked in the checking fixture. An arm, whose angular motion is to be measured, is connected by a pin to a slide. The slide is connected at its opposite end to a worm gear operated by worm on a cross shaft. Mounted on this shaft are a hand wheel and wheel-rim graduated in 0.001° .

This scale measures the number of degrees the valve arm moves when the hand wheel is turned. During a test, the valve is connected to hydraulic lines equipped with pressure gages that show when valve ports connected to the lines open or close.

Shear stress of welded fitting tested

Hydraulic piston rods for certain applications have fittings welded at one end. The weld must withstand a shear stress of 54,000 lb. A fixture designed to check this load includes a pair of channels and cross pin on which a lever arm sets at 45° angle pivots. A clevis on one end of the rod to be tested is pivoted to a pin passing through the lever. Lever arm lengths give about a 6 to 1 ratio.

At the outer end of the lever another clevis is fastened to the piston rod of a hydraulic cylinder. This cylinder is pivoted to a channel anchor. The rod to be tested bears in a stop at the opposite end of the channels. When hydraulic pressure of 1500 psi is applied to the cylinder, it creates the required 54,000-lb

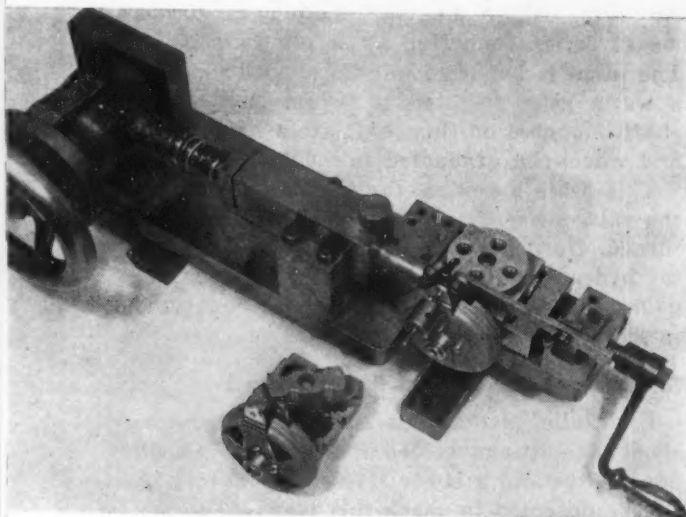


SIX POPPET valves are lapped simultaneously on unusual machine. Rouge in oil and light spring pressure are used.

Hydraulic valves (continued)

pull on the welded joint to be tested.

Many parts are broached in a horizontal La Pointe machine. Some broaches are 6 ft long, of fairly large diameter, and are heavy. After a broach is pulled through the workpiece and the part removed, broach and tailstock must be returned to starting position. Formerly this tiring operation was done by hand.



ANGULAR MOTION of valves (cut-away, foreground) is measured on rim of wheel graduated in 0.001°.

To avoid this extra labor, the broach was equipped with a motor-driven hydraulic pump. A hydraulic cylinder anchored below the end of the machine is connected by cable, block and tackle to the tailstock. The operator, by controlling a valve, can return broach and tailstock without effort and in less time.

A unique spotfacer has been designed to handle spot facing on an inside surface. The usual drill press or spindle tool is inadequate because the surface of the part is offset. It

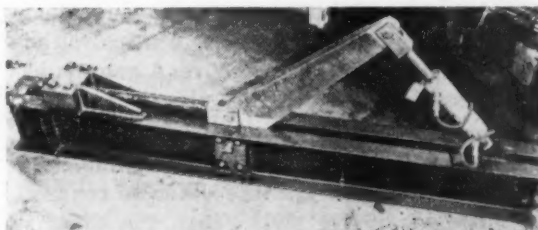
would be difficult or impossible to use a conventional spotfacer on this job. The spotfacer includes a pair of Oilite bronze plates between which there are three spur gears. The center gear is an idler, having an Oilite bushing that fits over a pin set into a hole in the fixture base.

Spur gear carries spotfacer

Between this and a second pin is a driving gear that fits a flanged shaft. The flange has a shank and cross pin driven by dogs on a hollow driver placed in a drill-press chuck. Below the flange a pilot extension passes through a hole in the base plate and is fastened by a nut and washer. The third spur gear, on the opposite side of the idler, carries a spotfacing tool.

The bottom leg of the C-shaped portion of the piece to be spotfaced is positioned under the tool. Driving dogs are engaged and the flanged shaft moves down against a light spring, carrying with it the gear assembly and the spotfacer.

Plates housing the gears slide vertically on the above-mentioned pins and on two other dowel pins. These pins keep the assembly from turning or cocking. Down feed is the same as for any spotfacer and, when the cut reaches depth, the housing bottoms.



WELD STRENGTH of fitting welded to piston rod is checked in hydraulic fixture. Weld must stand 54,000 lb pull.

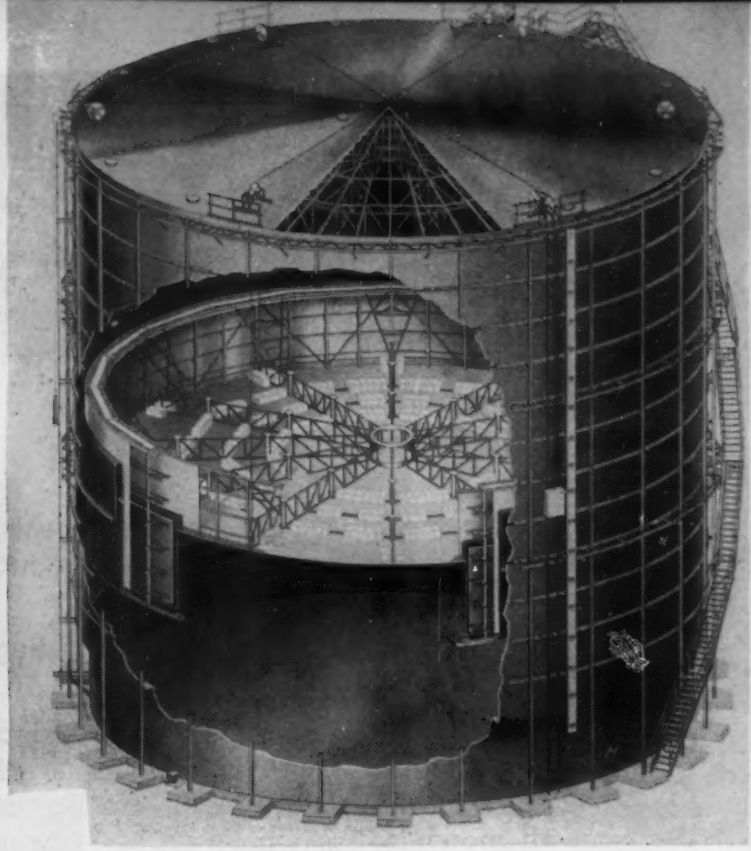
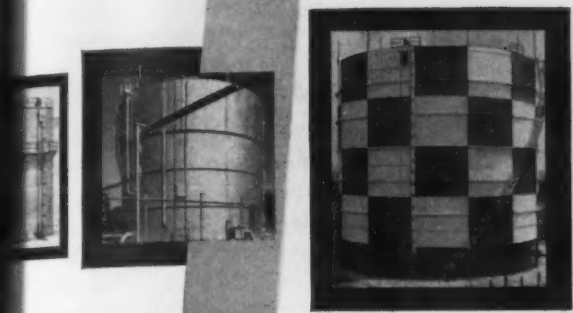
NEW BOOKS

"The Executive At Work," by Melvin T. Cope-land, outlines the fundamentals of organization and the qualities needed for attainment of executive leadership. Aspects of responsible administration—authority, lieutenants, being informed, keeping things moving, survival, risk, morale and reward are broadly considered. The book is practical, stimulating and aims to build teamwork. Harvard University Press, Cambridge 38, Mass. \$3.75. 277 p.

"Foundry Work," by Edwin W. Doe, briefly and skillfully describes the foundry process for the novice. Tools, methods, equipment and materials are explained and illustrated in detail. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. \$1.76. 109 p.

"The Instrumentation of Open-Hearth Furnaces," a publication of the British Iron & Steel Research Assn., is intended for those closely connected with furnace operation. It will also prove useful to those engaged in instrument maintenance. The book discusses principles of instrumentation and suggests how those principles can be applied to individual furnaces. George Allen & Unwin, Ltd., Ruskin House, 40 Museum St., London, W.C. 1. \$4.20. 159 p.

"Major Problems of United States Foreign Policy," in a survey of the present world situation, outlines the character of international relations since the war. Objectives of major powers and policy problems of the United States are reviewed. The Brookings Institution, Washington 6, D. C. \$1.50. 479 p.



safe, simple, 50 built in three years

See American Gas Association Builder's Committee Report (May, 1951)

As gasholders go, the Wiggins has a remarkably simple design. It has none of the complicated mechanisms of old-type gasholders. No materials that can be harmed by weather. Wiggins is the **ONLY** gasholder that uses no water, no tar, no grease. Wiggins assures no weather worries, no operating costs, no maintenance problems. It's the only gasholder with an absolutely dry, frictionless seal.

Designed by the famous conservation authority, John Wiggins. Built and erected by General American.

The frictionless piston rises and falls with changes in the gas volume. The gas tightness and impermeability of the Wiggins dry seal has been proved in actual operation.

Can be built to any capacity. Old gasholders can be converted and capacity increased as much as 50%.

Write for new bulletin WG22



for industrial and chemical process gases



GENERAL AMERICAN
TRANSPORTATION CORPORATION
135 South LaSalle Street, Chicago 90, Illinois

Offices: Buffalo • Cleveland • Dallas • Houston • Los Angeles • New Orleans • New York • Pittsburgh • San Francisco • Seattle • St. Louis • Washington • Export Dept.: 10 East 49th Street, New York 17, New York • Plants: Birmingham, Ala. • East Chicago, Ind. • Sharon, Pa



for **PRODUCTION ANNEALING
of CASTINGS LIKE THESE**

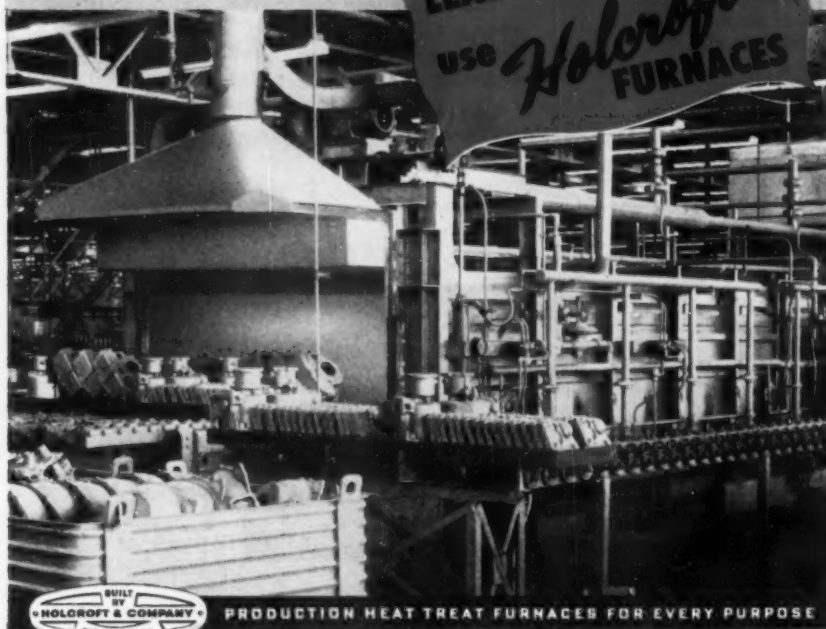
This compact Holcroft furnace anneals, descales and desands castings at a production rate of 10,000 lbs. per hour.

Not only that, but it delivers the castings at a lower cost per piece.

Foundries all over the country depend upon Holcroft to give them the furnace help they need. That's because Holcroft is such a well-known leader in the field. Many foundry practices, standard procedure today, were basic ideas worked out by Holcroft engineers.

You, too, can take advantage of this furnace know-how. Write today for complete information. **Holcroft and Company, 6945 Epworth Blvd., Detroit 10, Michigan.**

**LEADING FOUNDRIES
USE Holcroft
FURNACES**



BUILT BY
HOLCROFT & COMPANY
DETROIT - MICH.

PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO 9
C. H. Martin, A. A. Engelhardt
4209 South Western Blvd.

CLEVELAND 15
Wallace F. Scheit
1900 Euclid Ave.

HOUSTON 1
R. E. McArdle
5724 Navigation Blvd.

CANADA
Walker Metal Products, Ltd.
Windsor, Ontario

EUROPE
S. O. F. I. M.
Paris 8, France

—Free Literature—

Continued

Hand screw machine

A fast producer for short runs in bar stock and second operations is the hand screw machine. Described in a new 10-p. booklet, the machine features simple controls, a wide range of high to low spindle speed ratios, and quick, convenient operation of collet and feeding mechanism. *Brown & Sharpe Mfg. Co.*

For free copy insert No. 14 on postcard, p. 178

Rotary files

Rotary files and burs are described in a new 12-p. brochure. Pictured are types of rotary files, inside and outside tube deburring cutters, ball seat reamers in both high speed steel and carbide. Advantages of using ground-from-solid rotary files are discussed. Tips on operating speeds are included. *DoAll Co.*

For free copy insert No. 15 on postcard, p. 178

Four-way valves

Continuous fast cycling up to 600 cycles per minute without overheating is possible with 4-way valves described in a new data sheet. Production line valves described have registered over 40 million cycles on test. Solenoids are available for operation on standard voltages. *Barksdale Valves.*

For free copy insert No. 16 on postcard, p. 178

Insulation tester

Redesign of its 10-kv winding tester for detecting insulation faults and winding dissymmetries in motors, generators and coils is described in a new GE bulletin. The device, permitting quick, simple production-line testing, detects faults by stressing turn-to-turn and coil-to-coil insulation values. *General Electric Co.*

For free copy insert No. 17 on postcard, p. 178

Thermometers

A new 4-p. specification sheet describes the Brown indicating and recording thermometers. These non-control thermometers are available with indicators, with eccentric scales and one, two or three pens. *Minneapolis-Honeywell Regulator Co.*

For free copy insert No. 18 on postcard, p. 178

Scaife research

develops
stronger, lighter
pressure vessels



The pressure vessels and deep-drawn shapes being made today in the Scaife factory are *better* because of scientific research in Scaife Laboratories. For example, the development of the new Scaife Dura-Lite LP-Gas Cylinder included a complete study of the deep-drawing process, using half-size parts made on the research department press shown above. This procedure, supplemented by complete metallurgical, physical, chemical and specialized studies, permits accurate evaluation of various materials, drawing methods and processing procedure. The result is a better, more serviceable product designed and made on sound engineering principles.

SCAIFE COMPANY

OAKMONT (Pittsburgh District), PENNA.

Makers of Pressure Vessels
for Air, Gases and Liquids



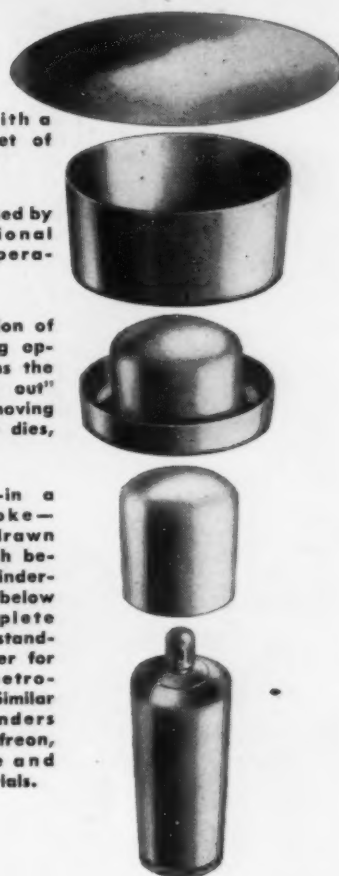
Here is the "big brother" of the press shown at the top of the page. Full-size cylinder-half has been formed in one stroke of the press (see right) and is being removed for processing and assembly.

Starting with a circular sheet of steel—

a cup is formed by a conventional drawing operation.

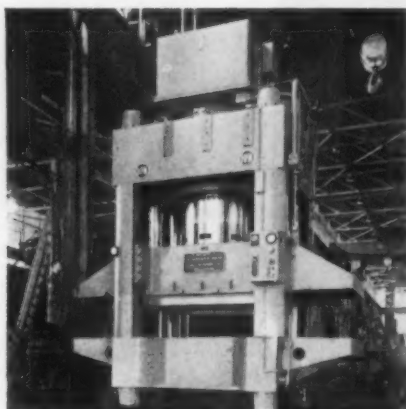
A continuation of this pressing operation turns the cup "inside out" without removing it from the dies,

completing—in a single stroke—the deep-drawn shape, which becomes a cylinder-half. Shown below is the complete cylinder, a standard container for liquefied petroleum gas. Similar Scaife cylinders are used for freon, acetylene and other materials.



NEW equipment

New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 175 or 176.

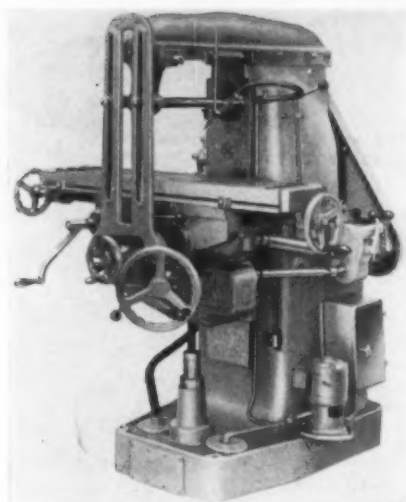


Giant quenching press handles hot armor plate

Designed for armor plate production this 2500-ton press handles large plates from $\frac{1}{2}$ to 2 in. thick. It has overall bed size measuring at ends, left to right and front to back, 72 x 235 in. Clearance between rod shields, left to right and front to back is 98 x 72 in. Hot armor plate from the hardening furnace is placed in the press and held under pressure between dies while being sprayed with cold water. Prior to the development of

the hydraulic press quenching method, the plate had to be straightened after it was cooled, employing mechanical presses and permitting only a small portion of the plate to be straightened in the press at one time. The H-P-M armor plate quenching press requires less than two minutes for the operation and eliminates subsequent straightening operation. *Hydraulic Press Mfg. Co.*

For more data insert No. 19 on postcard, p. 175



Sajo millers are medium duty, high speed type

Swedish Sajo horizontal milling machines are available in plain and universal models. Illustrated is the plain miller with power longitudinal, transverse and vertical feeds. Machines are of sturdy construction and meet the highest standards of accuracy, all sliding surfaces being hand scraped. Table size for both models is $41\frac{1}{2} \times 9\frac{1}{4}$ in. Longitudinal power traverse is $24\frac{1}{2}$ in. for the plain miller and $27\frac{1}{2}$ in. for the universal model. Transverse and vertical travel by hand or power feed are respectively $8\frac{1}{4}$

and 19 in. Twelve spindle speeds from 36 to 1540 rpm are available through pulleys and simple gear transmission. The hardened and ground chrome-nickel steel spindle has American Standard No. 40 milling machine taper. Spindle is mounted in SKF precision roller bearings and is equipped with SKF thrust ball bearings. Rugged construction and simplicity of operation should make these machines of interest to production and job shops. *Austin Industrial Corp.*

For more data insert No. 20 on postcard, p. 175



Special machine performs 104 operations

Automatic gaging, 100 pct preset tooling and a new type chip conveyor are featured in a new Transfer-Matic machine for a V-8 automobile engine crankcase. Cycle time of the new machine is 30 sec and hourly scheduled production is 90 pieces per hr. Of the 104 operations performed by the machine, 56 are drilling, 38 are counter-sinking and the remaining are spotfacing,

reaming, gaging and cleaning. Cutting speeds as high as 250 sfpm are employed on carbide-tipped spot-face cutters. There are 19 machine stations, including two gaging and one cleaning station. Chips are automatically conveyed to a central disposal point by an oscillating tray-type conveyor running through center of machine. *Cross Co.*

For more data insert No. 21 on postcard, p. 175

Turn Page

Exide-Ironclad

BATTERIES

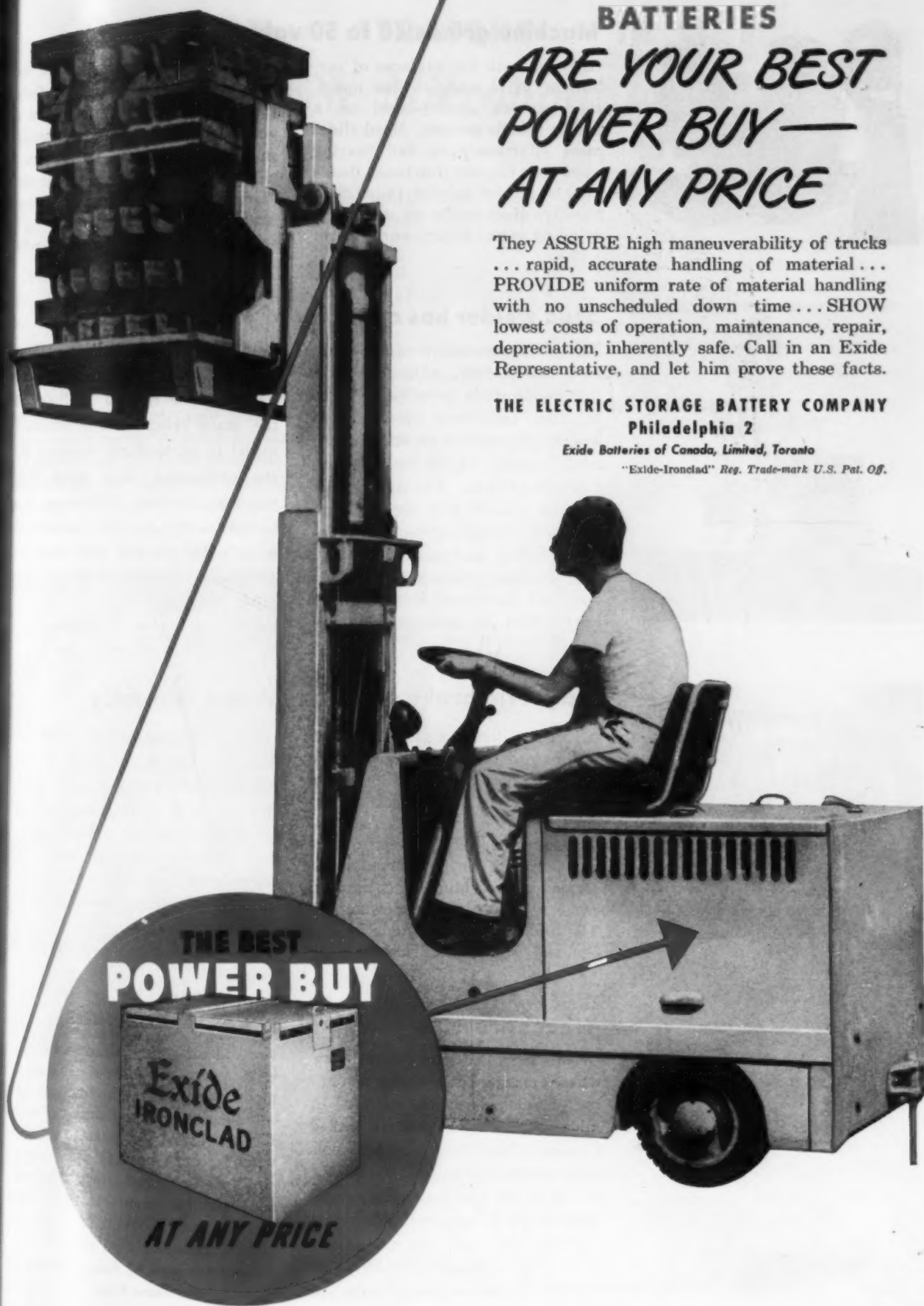
**ARE YOUR BEST
POWER BUY—
AT ANY PRICE**

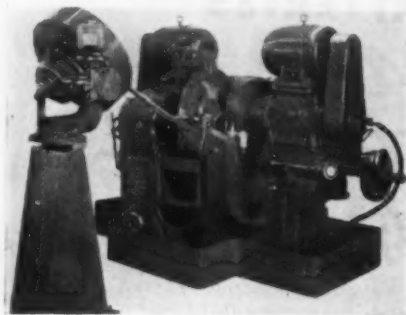
They ASSURE high maneuverability of trucks
... rapid, accurate handling of material...
PROVIDE uniform rate of material handling
with no unscheduled down time... SHOW
lowest costs of operation, maintenance, repair,
depreciation, inherently safe. Call in an Exide
Representative, and let him prove these facts.

**THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2**

Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" Reg. Trade-mark U.S. Pat. Off.



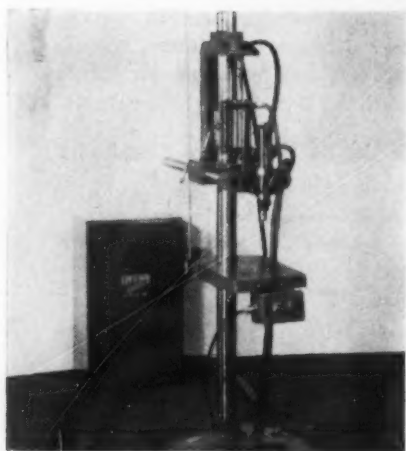


Machine grinds 40 to 50 valve seats per min

Grinding both flat surfaces of carburetor valve seats in one operation can be accomplished on a double spindle grinder. Head slides move effortlessly on ball bearing ways upon the cast iron base. Heads may be pivoted so that 18-in. diam abrasive disks can be set at the best grinding angle. Rotary work carrier

brings the small parts between the abrasives. The hopper feeder feeds the parts down a chute where a pneumatic transfer device rapidly snaps them into the rotating carrier. Valve seats are automatically ejected after grinding. *Gardner Machine Co.*

For more data insert No. 22 on postcard, p. 175

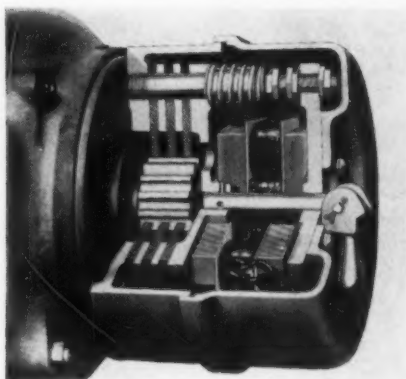


Stud welder has capacity of 3 to 6 welds per min

The KSM production stud welder is a heavy duty, adjustable unit that welds studs from $\frac{1}{8}$ to $\frac{3}{4}$ in. in diam and from $\frac{3}{4}$ in. up in length. It operates on standard dc while control circuit operates on 110 v 60 cycle ac. The control unit includes timers and air pressure regulator. Such accessories as indexing table, automatic vise, etc., can be easily plugged into outlets built into the control unit. A throat up to 18-in. is available with the

welding head and shut height can be varied from 0 to 30 in. The head itself can be rotated 360° around the main column. The standard model is particularly designed for the production shop where high speed application of fasteners is a necessity. Production can reach 15 to 20 welds per min with accessory equipment. *Stud Welding Div., KSM Products, Inc.*

For more data insert No. 23 on postcard, p. 175



Magnetic brake stops any motor instantly

Ac or dc direct acting disc-type magnetic brakes stop any motor instantly, hold the load, and release with no drag. The brake is spring engaged and magnetically released. It mounts on NEMA Type C motor flanges. The unit finds application on machine tools, hoists, cranes, elevators, screwdowns, etc. The brake has no solenoids or mechanical linkages. Friction discs,

springs and magnet constitute the heart of the unit. High thermal ratings are claimed for the brake. Torque and wear adjustment is made by adjusting a double set of lock nuts. Position of manual release lever indicates when adjustment is necessary. *Dings Magnetic Separator Co.*

For more data insert No. 24 on postcard, p. 175



Wheel dressing tools utilize whole diamonds

Group-mounted and chisel-face wheel dressing tools utilize a number of whole-diamonds mounted in a powdered metal matrix called C-metal. The group-mounted tools are recommended for large OD, straight-face applications where high finish is required. Each tool contains five, six, or seven diamonds, so arranged that three to five points are in contact with the

work at all times. Chisel-face tools with two or three diamonds mounted in a straight line, also are intended for large-diameter, wide-face dressing applications. The manufacturer accepts full responsibility for satisfactory performance and for furnishing the right tool for each particular job. *Christensen Diamond Tool Co.*

For more data insert No. 25 on postcard, p. 175

Turn Page

Tandem bearings made

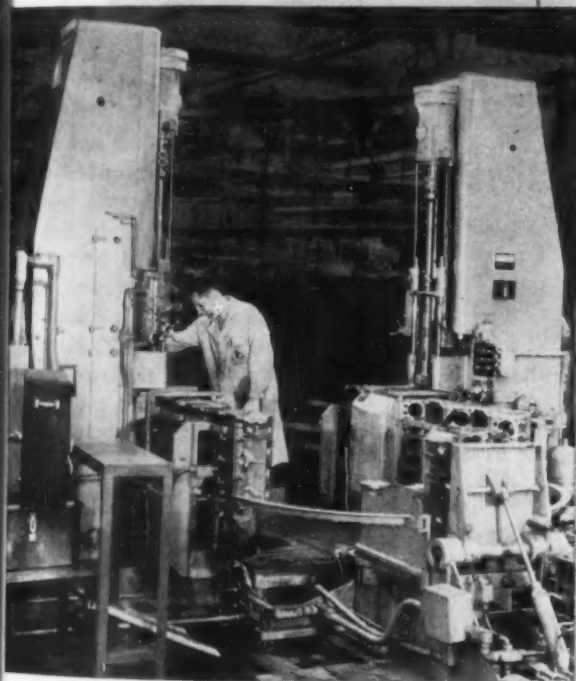
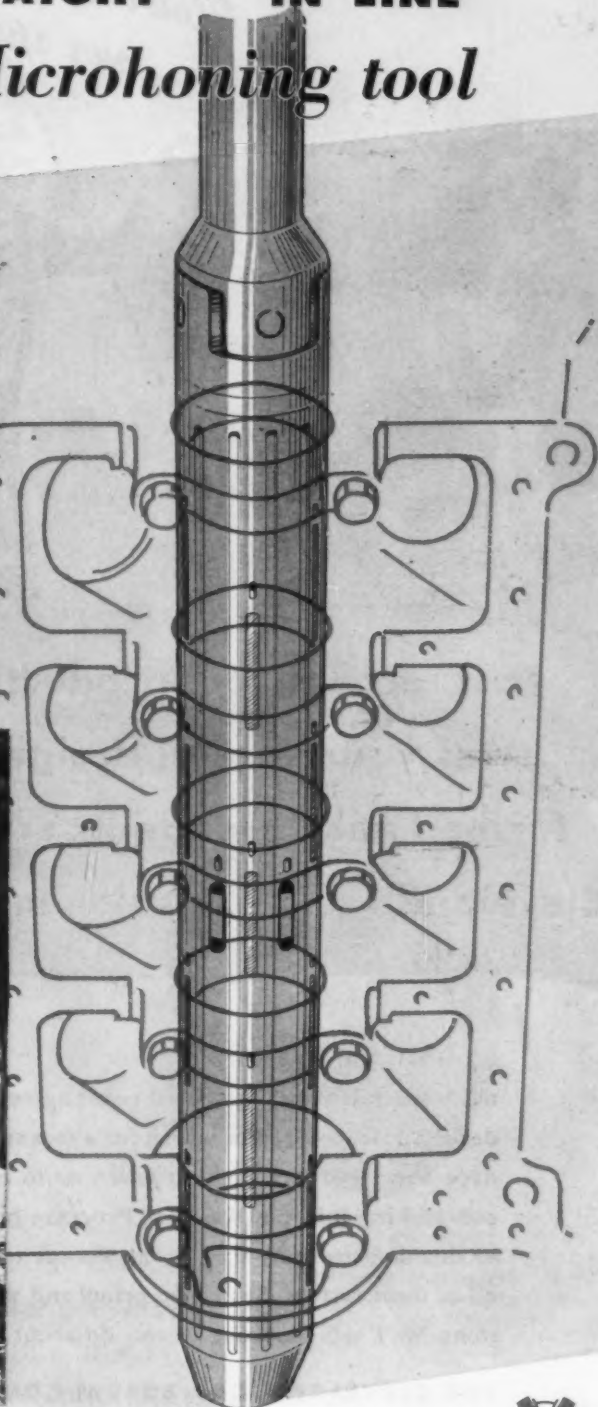
ROUND ★ STRAIGHT ★ IN LINE

with NEW Microhoning tool

ALL FIVE bearings in V-8 cylinder block MICROHONED within .0005" for diametric size, roundness, straightness and alignment.

Plastic guides stabilize tool and control cutting. One bank of abrasives MICROHONE all bores.

This double column Model 740 machine equipped with new guided type MICROMOLD tools MICROHONES Main Bearings in 60 blocks per hour, removing approximately .002" stock from the diameter of each bearing. The blocks are automatically taken from the line, conveyed to either of the columns, and MICROHONED. The operator makes occasional spot checks as the blocks leave the machine.

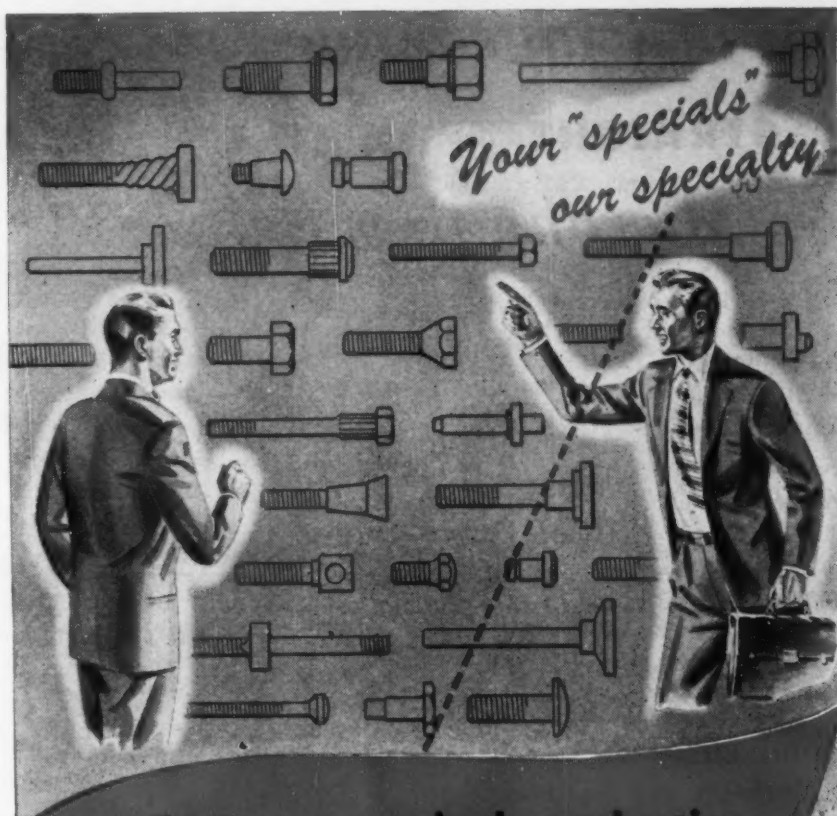


Write for Cross Hatch
for complete story
on MICROHONING
Interrupted Surfaces

MICROMATIC HONE CORPORATION

8100 SCHOOLCRAFT AVENUE • DETROIT 4, MICHIGAN

District Field Offices: 1323 S. Santa Fe Avenue, Los Angeles 21, California • 206 S. Main Street, Rockford, Illinois • 231 S. Pendleton Avenue, Pendleton, Indiana • MICRO-MOLD Manufacturing Division, Boston Post Road, Guilford, Connecticut • 53 George Street, Brantford, Ontario, Canada



*Your "specials"
our specialty*

**Fast, economical production
of your special design
formed and threaded parts by
Cleveland's cold extrusion methods**

This may be a *better way* for you to procure those special integral parts that your engineers have designed. It pays you to search for a means to produce a *stronger* part, make it *faster*, or to *lower its cost*. Making it by our Kaufman Process—by single or double extrusion—may be the answer to one or all of these factors. Send blue prints and specifications. We'll tell you what we can do about it.

THE CLEVELAND CAP SCREW COMPANY
2917 East 79th Street, Cleveland 4, Ohio

CLEVELAND *Top Quality* **FASTENERS**



originators of the Kaufman **DOUBLE EXTRUSION** **Process**

Ask your jobber for Cleveland Fasteners

New Equipment

Continued

Labor-saving masks

Fast, accurate masking for production line spray or brush painting and sandblasting is possible with an improved pressure-sensitive-type paper mask. Ninety per cent reduction in manhours plus higher production with lower material cost are claimed through the use of this custom die-cut mask. Accurate but inexpensive dies are made on special die-cut presses with capacities up to 20 x 36 in. A special grade of pressure sensitive adhesive is impregnated on the back of the tough paint and lacquer-resistant masking paper. Sufficient adhesion holds edges down tight yet peeling is easy. Special heat-resisting paper for bake ovens is available. Free samples and quotations are available by sending pattern or blue print of surface to be masked, and quantities required. *By-Buk Co.*

For more data insert No. 26 on postcard, p. 173

Remote control

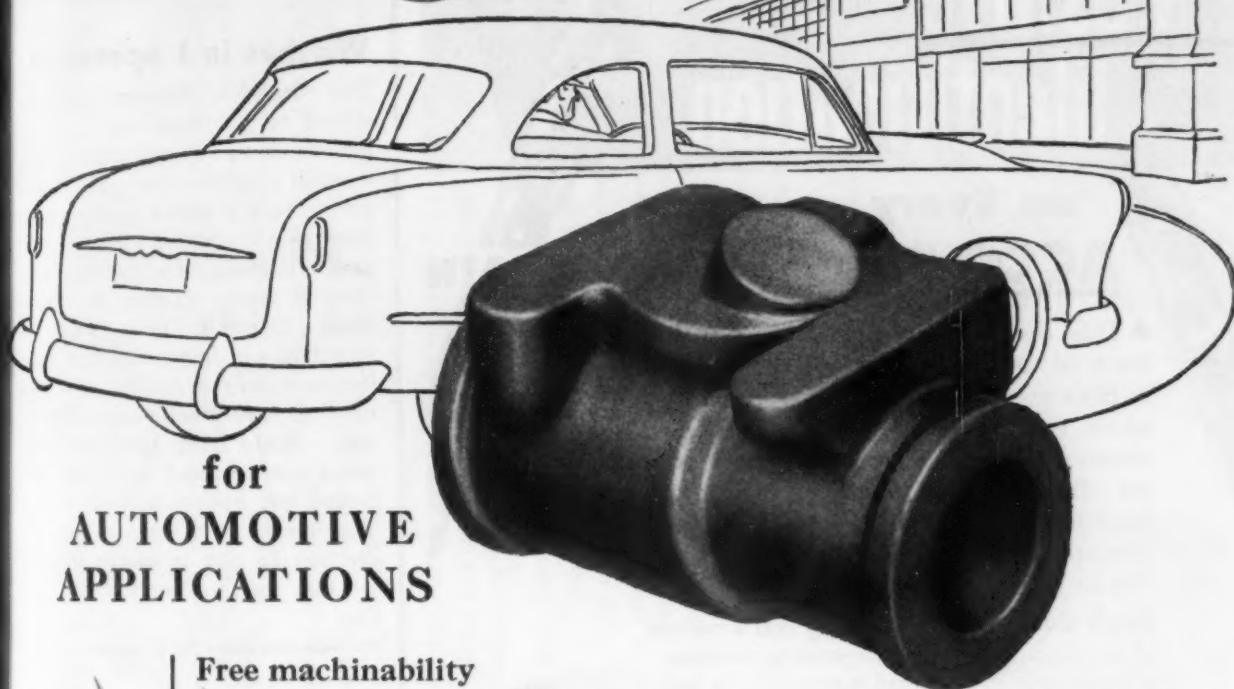
With an attachment for fork trucks, truck operators can control action of the forks at a distance from the truck's control panel. Lifting and lowering is controlled by the unit held in the operator's hand. During normal operation it clamps over the tie bar on the truck's inner upright. Cable for the remote control unit is housed in reels, under tension, so that it won't kink. *Baker-Raulang Co.*

For more data insert No. 27 on postcard, p. 173



Turn Page

Eaton Permanent Mold Gray Iron Castings



for
**AUTOMOTIVE
APPLICATIONS**

Free machinability

Dense, non-porous structure

Uniform structure throughout the casting

Freedom from leakage under pressure

Machines to high, mirror-like finish


Properly annealed; no growth or distortion after machining

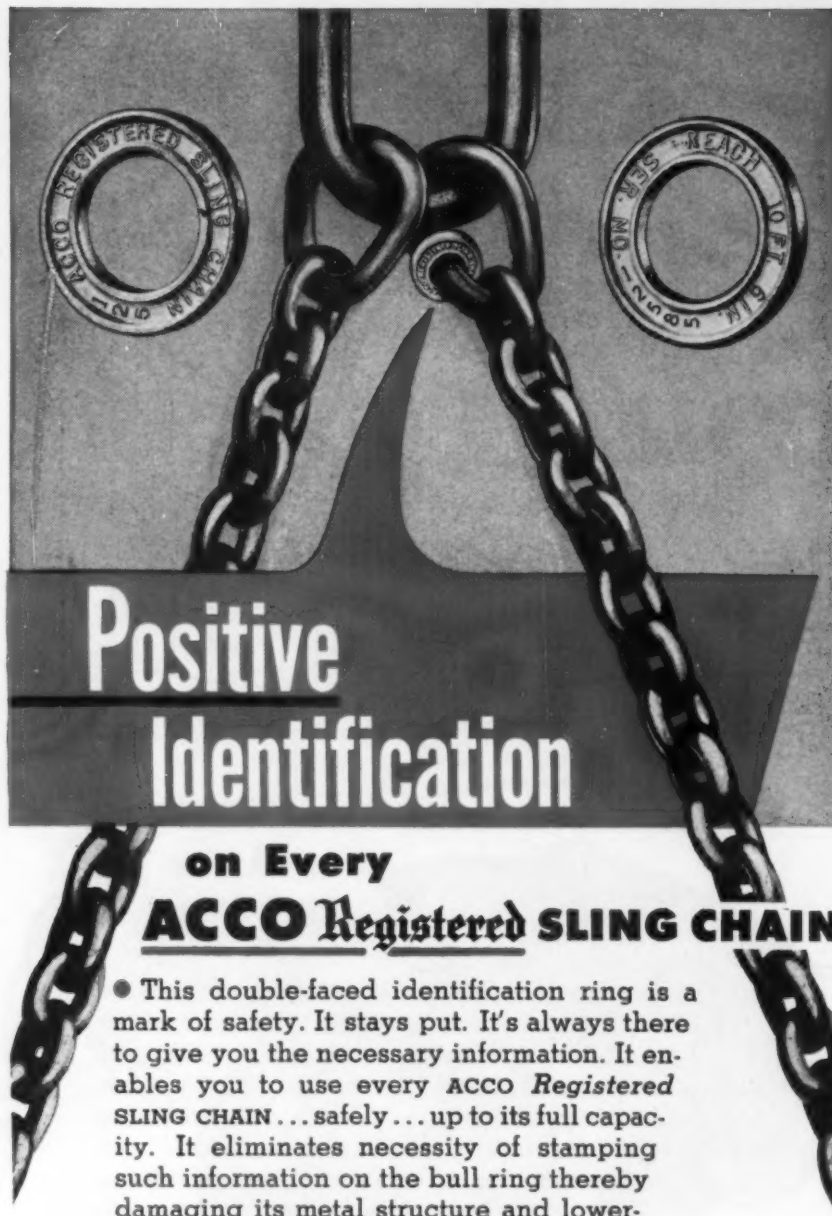
Send for your copy of
the illustrated booklet,
"A Quick Picture of the
Eaton Permanent Mold
Process for Producing
Gray Iron Castings."

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

FOUNDRY DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

 **PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet
Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings
Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



Positive Identification

on Every **ACCO Registered SLING CHAIN**

• This double-faced identification ring is a mark of safety. It stays put. It's always there to give you the necessary information. It enables you to use every **ACCO Registered SLING CHAIN**... safely... up to its full capacity. It eliminates necessity of stamping such information on the bull ring thereby damaging its metal structure and lowering its lifting capacity.

Don't Gamble... Don't guess that a certain sling chain will lift an expensive machine. The damage to men and material is far too costly. Select the types, sizes and materials needed for your work from the complete line of **ACCO Registered SLING CHAINS**. The positive identification ring on each one gives you assurance that the unit was rigidly inspected and fully tested. You can't buy better sling chains.

Send for your copy of Catalog DH-80. It shows you how to select, use, and care for sling chains.



"Intentionally Better"
SLING CHAINS

ACCO

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.



**AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE**

In Business for Your Safety

New Equipment

Continued



Washes in 1 operation

The Klee-Flo Powermaster is designed to hot wash an entire engine block in one operation. Rapid, vertical strokes of the motor-driven rack create a washing pressure in the heated cleaning compound, flushing off grease and grime without mess. It does in minutes what formerly took hours. A powerful gas immersion type heating unit works equally well with natural, manufactured or bottled gas. Motor and agitating apparatus are enclosed in a leak protected but accessible rear section. The winch, an accessory, can handle 300 lb and is easily operated by one man. *Practical Products Co.*

For more data insert No. 31 on postcard, p. 173

Slitting saw

Thicknesses down to 0.30 in., with tolerance held to 0.0002 in. feature a carbide tipped Thinsaw used for extreme precision slitting. Diameters range up to 5 in. Ample chip clearance is provided in the new saw. A specially designed circular seat produces a braze that holds the tips securely as in thicker cutters. The saws produce deep cuts without runout and can be built flat with no protruding hub so that they may be lined up side by side for close multiple cutting. *Gay-Lee Co.*

For more data insert No. 32 on postcard, p. 173

Turn Page

THE ACTUAL IS LIMITED:

THE POSSIBLE IS IMMENSE

NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1951

BUILDS LIGHTER, STRONGER PRODUCTS AT HALF THE COST

By **Robert F. Christian,**
General Manager, J. D. Christian Engineers
San Francisco, California

ORIGINALLY, our gearmotor housings were made from gray iron. However, during World War II we developed many techniques in welding these gear cases that are saving materials, manpower and shop cost. Among the advantages gained by our conversion to welded steel are the following benefits:

1. Savings in weight alone have proved important to equipment builders who use our products and who must ship their machinery "prepaid" to all parts of the country. The weight savings also allow lightening up supporting structures to save construction costs of our customers' products.

2. Shorter shop schedules are improving our

own deliveries by eliminating the demand for core work formerly required on our original designs and which was not attractive to suppliers.

3. With welded construction, our products are more adaptable for use on special machines. For example, the relocating of mounting bolt holes is now easier.

4. Ninety per cent of the machining time formerly required has been eliminated.

Conservatively speaking, our shop turns out comparable equipment for about half of the original cost in gray iron.

Similar savings are undoubtedly possible on many of your present and proposed products. A Lincoln Welding Engineer will gladly work with your designers to show how you can benefit with welded steel. Call or write.

PROPER DESIGN IN WELDED STEEL ALWAYS IMPROVES PRODUCT AND LOWERS COSTS

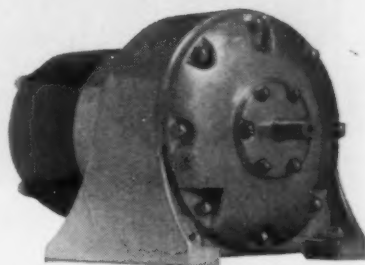


Fig. 1. Original Construction of gear motor housing. Required 90% more machining. Weighed 175% more than welded steel.

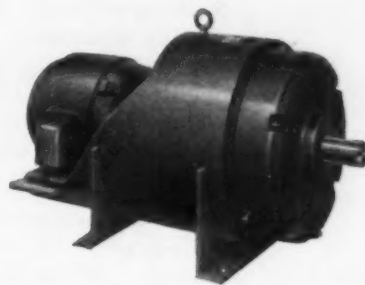


Fig. 2. Present Weld design in Steel. Costs 50% less. Further saves shipping costs "prepaid" by manufacturers, using the product.

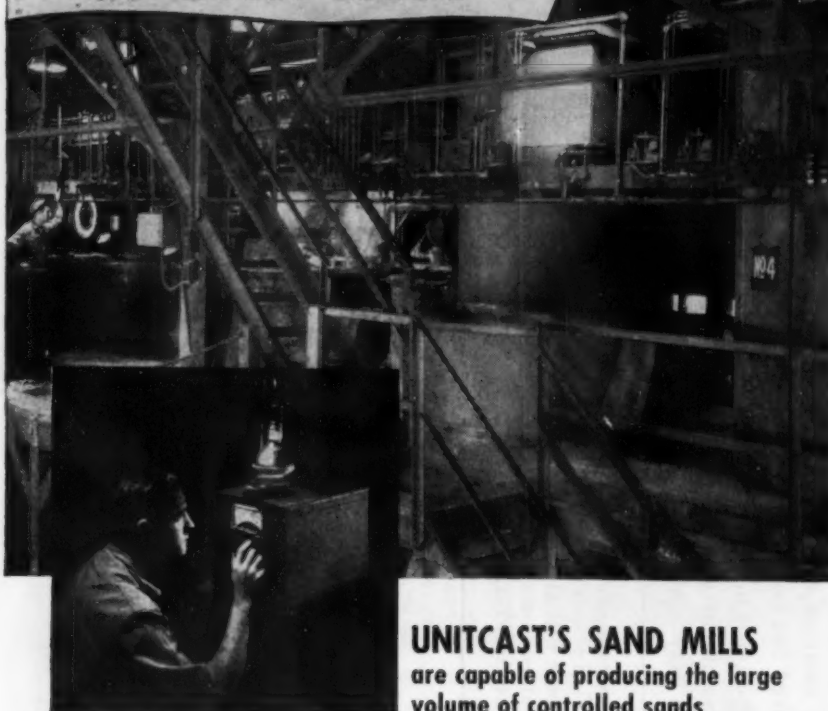
HERE'S PROOF

Machine Design Sheets are available to designers and engineers. Simply write on your letterhead to Dept. 513

THE LINCOLN ELECTRIC COMPANY
CLEVELAND 17, OHIO

December 6, 1951

Sand Process Control at UNITCAST



UNITCAST'S SAND MILLS
are capable of producing the large
volume of controlled sands
necessary to assure the production
of top quality Unitcastings.

The new moisture tester pictured in use has an infra-red drying lamp. The unit is a completely enclosed torsion balance, with dial calibrated directly in percentage of contained moisture.

Striking evidence of the adequacy of Unitcast's production equipment backed by continual laboratory control. Sands are milled with exacting care and thoroughly tested in Unitcast's completely equipped sand and testing laboratory to guarantee the production of highest quality Unitcastings.

A graphic example of the coordination existing between production and laboratory control departments at Unitcast.

UNITCAST

Corporation

QUALITY STEEL CASTINGS



Give us a chance to offer a "cast steel" answer for your parts problem. Our suggestions while your product is in the design stage will pay continuous dividends. Write or call today. Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. In Canada: Canadian-Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCASTINGS ARE FOUNDRY ENGINEERED

New Equipment

Continued

Work clothes that last

High replacement cost of ordinary work clothes that have been eaten away or damaged after comparatively short service can be substantially reduced by the use of ChemKlos, work clothes made of the new Dynel fabric that resists corrosive chemicals, acids, caustics, moths, wear, mildew, shrinkage, snagging and tearing. Available in shirts, trousers and coveralls, ChemKlos offer complete protection, yet are comfortable and neat appearing garments. They are easily cleaned and are not harmed by commercial dry-cleaning and washing solvents. *Mine Safety Appliances Co.*

For more data insert No. 33 on postcard, p. 179

Lubricant-coolant

Increased effectiveness by free flowing and compressed air application is claimed for a new lubricant-coolant developed for metal cutting and drilling operations. Cool-o-lube is a concentrate diluted one part solution to nine parts of water. It is non-injurious to health of machine operators, has no odor, gives no smoke, is non-rancid, and non-rusting. High film strength, super-oiliness, low viscosity are its characteristics. It will remove with water. Also it is claimed to absorb $2\frac{1}{2}$ times more heat than oil. The Goodyer Pure-o-luber is recommended equipment for handling this solution. *Air Conversion Research Corp.*

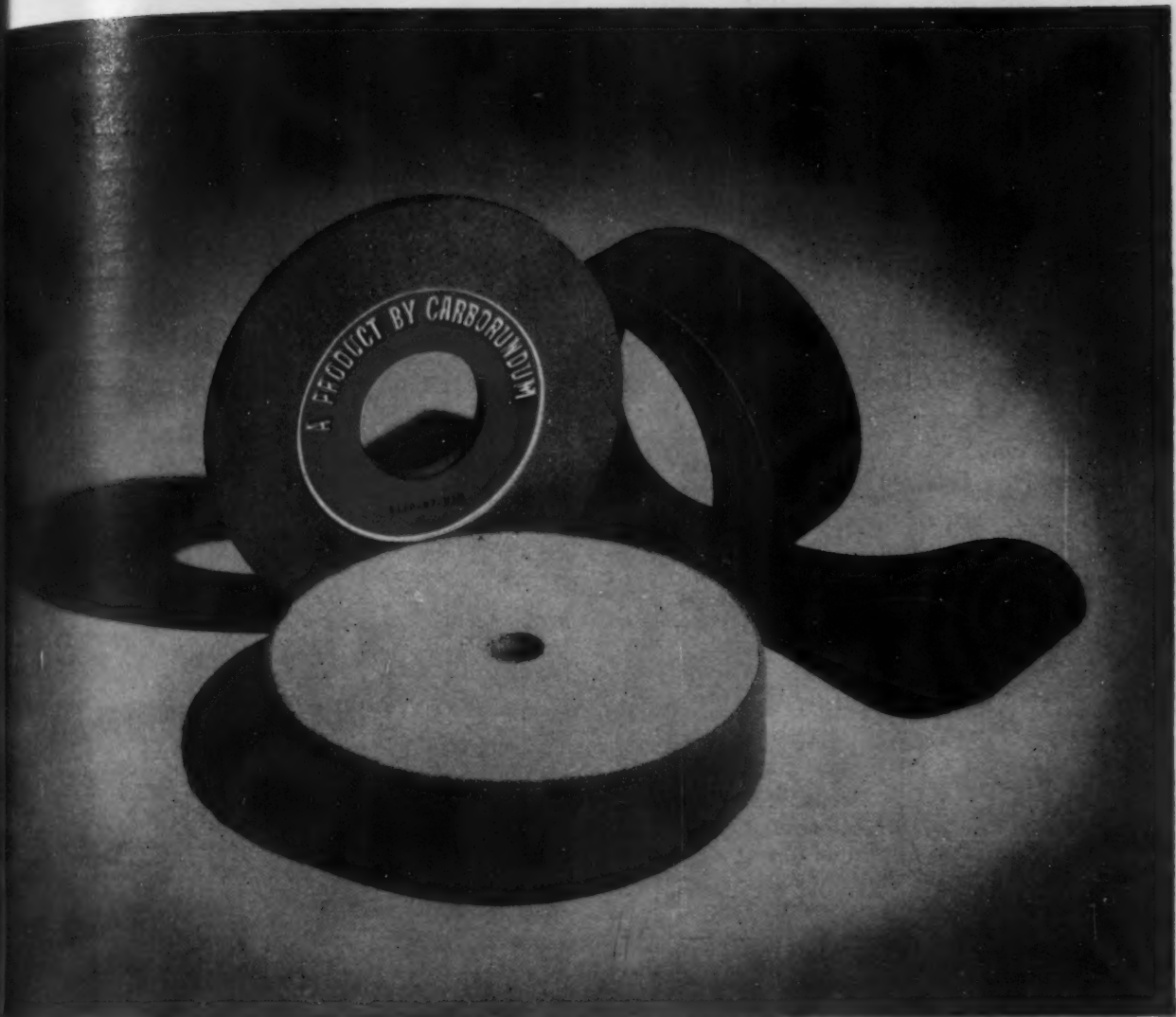
For more data insert No. 34 on postcard, p. 179

Precision tubing

Fine drawn, precision low carbon, welded and drawn steel tubing is said to offer possibility of substitution in many places where nonferrous and alloy metal tubing were used. The new low carbon steel tubing is accurately drawn to close tolerances of inside diameter, outside diameter and wall thicknesses. It is available in a range from 0.500 to 0.010 in. OD with wall thicknesses down to 0.0015 in. *Precision Tube Co.*

For more data insert No. 35 on postcard, p. 179

Turn Page



You can't miss...

Not when you pick a product by CARBORUNDUM. A complete line of all abrasive products is your assurance of selective product application. You match the best method with the right product from the complete standard line by CARBORUNDUM.

Thus, the recommendation of an experienced CARBORUNDUM salesman or distributor is not merely helpful...it's impartial.

These men have no reason to offer anything but the best method and product for your job...they sell the only complete line of products identified by the best known name in abrasives.

This experience in all abrasive products and methods is an excellent proving ground for new products and methods. Ask your CARBORUNDUM representative about them. You can't miss.

Only **CARBORUNDUM**

TRADE MARK

makes **ALL** Abrasive Products...to give you the proper **ONE**

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company, Niagara Falls, N.Y.

07-26

December 6, 1951

191

SIMPLIFY PNEUMATIC DESIGN

with this unique electrically - operated AIR CYLINDER with HYDRAULIC CONTROL



MODEL BEM AIR MOTOR

HC-12 HYDRO-CHECK

Provides Absolute smoothness of piston movement — eliminates the natural "bounce" or "springiness" of air.

Permits Positive Control of Piston Speed in Either or both directions and at any point in piston travel.

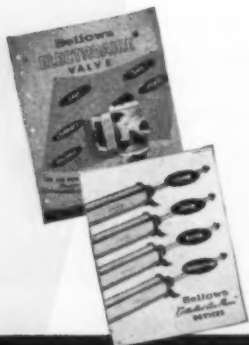
WITH Bellows "Controlled-Air-Power" you can combine the speed, economy and flexibility of air-power, the smoothness of hydraulic operation, and inter-locked electrical control, all in a compact, space saving, easily installed assembly.

The Bellows Model BEM Air Motor (a double acting air cylinder) is a complete power unit in itself. Valve, electric valve operating controls, and speed controls are all built-in. The low-voltage built-in solenoid controls operate all day at high speed without hum, pounding, or excessive heat.

When used in the same assembly with the new Bellows Hydro-Check (an adjustable Hydraulic Resistance Unit) you obtain precision control and precision operation of pneumatic systems, easily adjusted to fit any operating requirement.

As a design engineer you'll be interested in knowing more about the Bellows system of pneumatic operation and controls. We'd like to send you two new bulletins showing how "Controlled-Air-Power" operates. No cost. No obligation. Just drop us a note and ask for your

copies of Bulletins AV-300 and CL-30. Address The Bellows Co., Dept. IA 1251, Akron 9, Ohio.



The Bellows Co.
Akron 9, Ohio

FIELD ENGINEER OFFICES IN ALL PRINCIPAL CITIES

New Equipment

Continued

Low-temperatures

Sub-zero temperatures as low as -40°F are reached in the Rigid-Frigid cabinet, which can be used for rivet cooling, shrink fit assembly, size stabilization in metal, treating hardened steels, applying sub-zero cooled compressed air to metal cutting tools. Easy-action foot treadle opens the lid and leaves both hands free for handling frozen parts or materials. Cabinet measures 40 in. long x 36 in. high x 32 in. wide. *Brewer-Titchener Corp.* For more data insert No. 38 on postcard, p. 178.

Aircraft ac generators

Three-phase, ac generators especially designed for aircraft are available in a variety of ratings from 15 to 90 kva at 120/208 v. Normal operating speeds range from 3800 to 8000 rpm. Advantages for the ac generators include: savings in weight up to 30 pct; positive short circuit protection; perfect sine wave output allowing proper operation of electronic equipment. *General Electric Co.*

For more data insert No. 37 on postcard, p. 178.

Stock checker's truck

The stock checker's truck is designed to handle a variety of items or parts, with writing table and stationary rack welded to the frame. Three steel shelves have 1-in. flange all around to prevent materials from falling off. Two rubber tired roller-bearing casters at push handle end swivel; two at other end are rigid. *Palmer-Shile Co.*

For more data insert No. 38 on postcard, p. 178.



Turn Page

Alliance

**FIRST IN SIZE
FIRST IN CRANE DESIGN**



We produce big and unusual cranes. We are delighted with unheard of and almost impossible applications for cranes. For example, above is a 270-ton gantry crane installed fifteen years ago on this dam. Successful operation of the dam depends on the crane. Similarly, other huge applications depend on big Alliance cranes. On this crane two 135-ton trolleys can act independently or in combination when lifting loads in excess of 135 tons. One trolley is equipped with a 20-ton auxiliary hoist to lift lighter loads.

For fifty years, Alliance has been designing, engineering and building giant cranes for heavy industry. Where unusual types of cranes are required—for any service—Alliance engineering experience and diversified background of its personnel is generally sought.

Thousands of Alliance cranes are on the job today hoisting and shifting gigantic loads . . . safely, smoothly, quickly, economically. Always rely on Alliance to give your plant dependable extra lifting power.



THE ALLIANCE MACHINE COMPANY

MAIN OFFICE

ALLIANCE, OHIO

PITTSBURGH OFFICE

1622 OLIVER BUILDING, PITTSBURGH, PA.

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

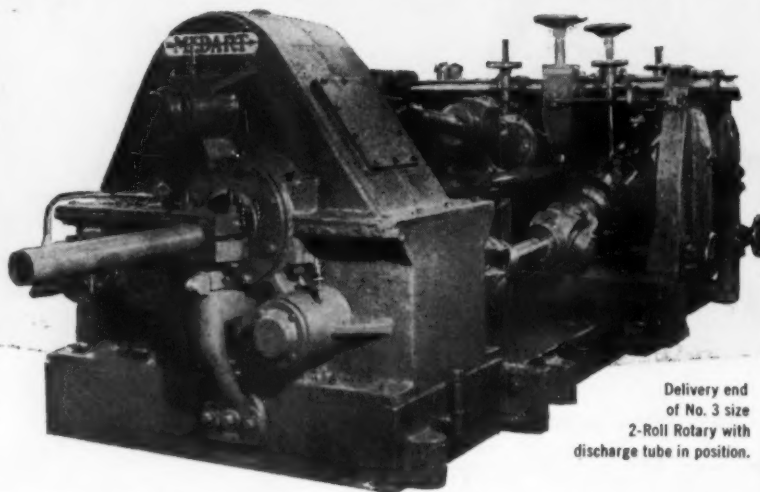
Continuous & Automatic End-to-End Straightening

...of round tubes and bars, $\frac{1}{8}$ "
to 10" diameter, as short as 1"



2-ROLL ROTARY STRAIGHTENER, SIZER & POLISHER

Single Motor Type—10 Different Sizes For All Requirements



Delivery end
of No. 3 size
2-Roll Rotary with
discharge tube in position.

- Precision straightens, sizes and polishes, and corrects out-of-roundness, from end to end, on any round ferrous or non-ferrous workpiece
- Produces a more user-acceptable, uniform, improved finish on hot-rolled and pickled bars
- Puts a super finish on cold-drawn, turned and ground stock
- Removes mill scale from hot-rolled surfaces
- Improves the physical properties of the workpiece
- End-to-end feeding gives continuous, uninterrupted operation. Automatic feed-through and discharge
- Two-direction operation permits additional passes for sizing and polishing

Write For Complete Catalog

THE MEDART COMPANY 3535 DE KALB STREET
ST. LOUIS 18, MISSOURI

—New Equipment—

Continued

Stainless steel coating

Stainless steel coating for all metal surfaces protects against rust, corrosion and other types of deterioration. It is applied by brush or spray gun producing a film that is nonflammable, odorless, tasteless when dry. It dries to handle in 3 to 60 min; for regular use in 3 to 4 hr. *Steelcote Mfg. Co.*

For more data insert No. 39 on postcard, p. 17

Packaged springs

Two new compression spring assortments are being introduced to the trade. A large assortment contains 60 springs, 2 each of 30 different sizes; a small assortment has 30 springs, 2 each of 15 different sizes. All springs are made of music wire. They range in diameter from $\frac{3}{32}$ to $\frac{1}{2}$ in. and are made in 10-in. lengths. The user can select the size required and cut to length. *Reid Tool Supply Co.*

For more data insert No. 40 on postcard, p. 17

Safety-parking lines

A new version of the Florline marking machine makes it possible to mark safety and parking lines within $\frac{1}{8}$ in. of partitions, aisles, ways, tool cribs, machines and stock. Complete without motor or attachments of any kind, it operates on the gravity feed principle, making lines at walking speed almost flush with walls, curbing, warehouses. The machine can be operated by one man, using one hand to guide and control it. *H. C. Sweet Co.*

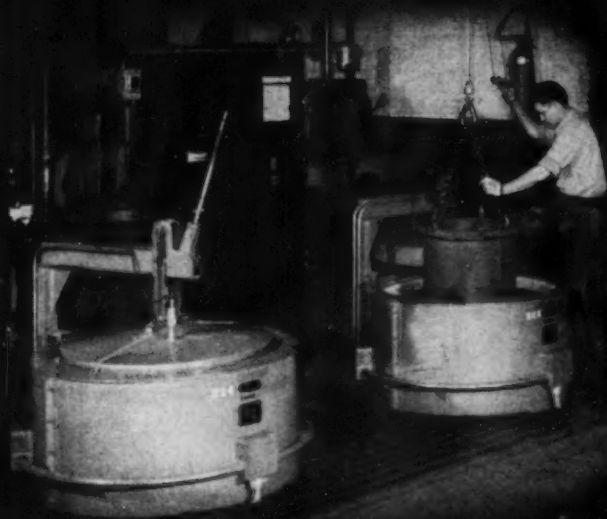
For more data insert No. 41 on postcard, p. 17

Power screwdriver bits

A new line of power screwdriver bits consists of many sizes and styles of $\frac{1}{4}$ -in. hex drive and threaded shank bits for slotted, Phillips & Frearson or Reed & Prince screws. A special alloy steel, precision machining to close tolerances, accurate heat treating and careful finishing have been combined to produce bits that provide maximum service in difficult driving jobs such as self-tapping screws. *Ludwig Hommel & Co.*

For more data insert No. 42 on postcard, p. 17

We make them
as if we were going to use them



Precisely controlled heat treating is just one of the steps taken at Accurate to assure adherence to your specifications.

... and it lowers
the overall cost of your springs

HERE at Accurate we make springs the way we'd like to have them made for us if we were the user. We believe this guarantees you the best possible springs—uniformly **RIGHT** springs that permit maximum assembly rates and reduce the number of rejects due to faulty operation. It all adds up to lower manufacturing costs and better product performance for you.

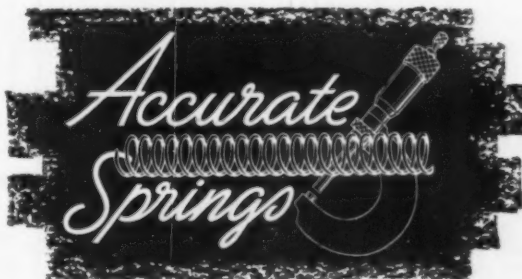
Plan now to find out more about

Accurate spring service and try Accurate on your next job. **ACCURATE SPRING MFG. CO.**, 3819 W. Lake Street, Chicago 24, Ill.

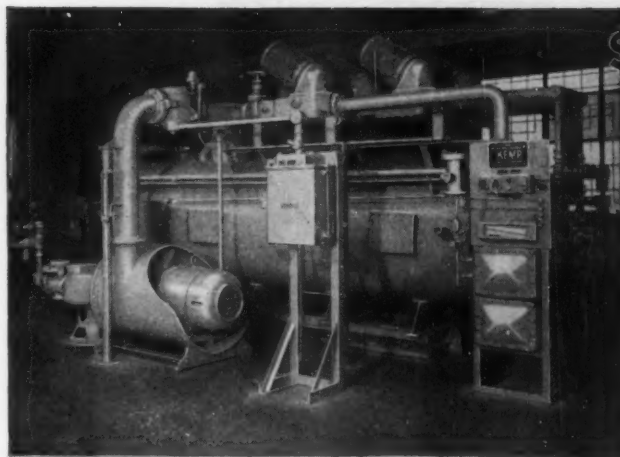
Ask for your free copy of the new revised Accurate Handbook of Technical Data on Springs. This booklet has been out of print for some time and if you have previously asked for a copy and have not received it, we would appreciate your asking again.



*Be sure the
springs you
buy are
Accurate*

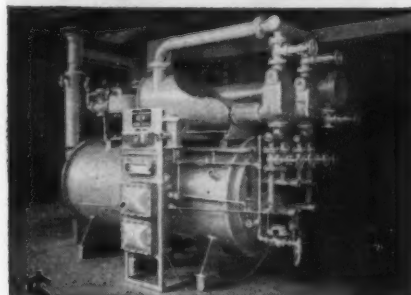


*Springs
Wire Forms
Stampings*

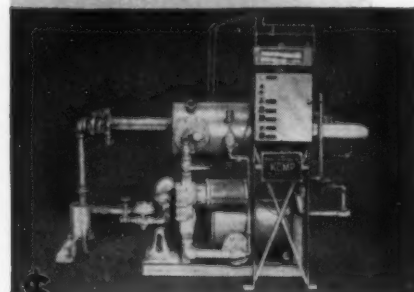


\$ Model 60 MIHE produces 60,000 cfh . . . is widely used for purging and blanketing in the petroleum industry.

Why Pay Premium Prices For Inerts?



\$ Model 6 MIHE is ideal for agitating, bubbling and blanketing in synthetic resin plants . . . delivers 6000 cfh.



\$ Model 1 MIHE offers all the features of larger equipment . . . delivers 1000 cfh . . . is fully automatic.

KEMP Inert Gas Producers Can Save You up to 90% on Inert Gas Costs

Whether you now use bottled inerts or produce them with old-fashioned equipment, switch to a Kemp Inert Gas Generator and save 83% to 90% on your inert gas costs. Kemp Inert Gas Producers and Kemp Nitrogen Producers are available in standard models with capacities ranging from 500 to 200,000 cfh for fully automatic operation.

ABSOLUTELY DEPENDABLE

No matter what the demand, Kemp Inert Gas Generators give you the same analysis Inert Gas from 20% to 100% of capacity. The Kemp Industrial Carburetor, part of each installation, burns ordinary gas just as it comes from the mains. Assures complete combustion without "tinkering." Produces a clean, chemically inert gas to meet your most exacting requirements.

SEND FOR DATA

Whatever your requirements, always specify Kemp. To find out how you can benefit: Tell us your atmosphere gas problem, and we'll show you how Kemp can solve it and save you money!

KEMP

OF BALTIMORE

INERT GAS GENERATORS

Write for Bulletin I-10 for technical information.
C. M. KEMP MFG. COMPANY,
405 E. Oliver St., Baltimore 2, Md.

CARBURETORS • BURNERS • FIRE CHECKS • ATMOSPHERE & INERT GAS GENERATORS
ADSORPTIVE DRYERS • METAL MELTING UNITS • SINGING EQUIPMENT • SPECIAL EQUIPMENT

—Technical Briefs—

Furnaces:

U. S. enamellers could heat treat 70 million lb daily if war came

The 600 enameling furnaces in the porcelain enameling industry could heat treat approximately 70 million lb of war work daily if the entire industry were required to convert its facilities.

In addition, a related amount of pickling facilities would be available, E. W. Dany, vice-president of Ferro Corp., recently told the Porcelain Enamel Institute.

Speaking as a member of the Furnace Utilization sub-committee of the PEI's Government Business Committee Mr. Dany also advised that industry conversion was not likely short of a shooting war.

In discussing the furnace situation in case of war, Mr. Dany pointed out that industrial heat treating furnace manufacturers were swamped with orders and handicapped by a shortage of insulating fire brick.

Box type furnaces which are still widely used by the porcelain enameling industry can, however, be converted almost immediately to heat treating, with or without controlled atmosphere.

The continuous type furnaces, which have been growing in number within the industry, require considerable alteration both internally and externally.

Fairer Timestudy Methods Urged

Five requirements for timestudy systems that meet modern industrial needs include scientific basis, greater consistency, increased accuracy, fairer standards, and provision for methods improvement, James H. Duncan of the Work-Factor Co. recently told the Industrial Management Institutes of the University of Wisconsin.

Conventional stopwatch techniques, Duncan pointed out, only tell how long a specific operator requires to do a job, and then only for the interval and conditions during the study.

They do not, he warned, tell whether the operator is working

Turn Page

Defense

Produce MORE goods at LOWER costs

with ^{TRADE} Verson ^{MARK} presses

A "guns and butter" economy puts more pressure on production than we have ever known short of all out war. But with metal working equipment in short supply, machinery programs must be planned well ahead. If your needs include presses or press brakes, we would like to show you the many recent advancements engineered by Verson to make it possible to produce more goods, more efficiently.

While we are presently operating night and day in an effort to meet the tremendous demand for Verson equipment, our engineers will welcome the opportunity to assist you in your long range planning and show you how modern stamping techniques developed by Verson can help you produce more efficiently.



800 ton Verson Hydraulic press used by Stolper Steel Products Corp., Milwaukee, to form military gasoline cans. (Photo Courtesy Milwaukee Sentinel.)

Originators and Pioneers of Allsteel Stamping Press Construction

VERSON ALLSTEEL PRESS COMPANY

9314 Kenwood Avenue, Chicago 19, Illinois

Holmes Street and Ledbetter Drive, Dallas 8, Texas

A Verson PRESS FOR EVERY JOB FROM 60 TONS UP!

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING
DIE CUSHIONS • COMPRESSION AND TRANSFER MOLDING PRESSES

December 6, 1951



Why does Jack use the back door?

BRAINARD STRAPPING TOOLS, like the one husky Jack Griffin of Rochester and Syracuse carries here in his left hand, are often worth their weight in gold to some strapping user to keep production rolling.

On rush occasions like this, Jack gives the order personal delivery—right on through the shipping room door. Once there, he sticks with it until things are running smoothly.

Jack used to play a lot of football at Niagara University, got in the habit of tackling problems head on. Locating a replacement tool for a customer in a jam, giving personal follow-through, bringing out factory experts for technical advice don't rate as unusual in the eyes of Jack Griffin and his fellow Brainard Strapping System representatives.

To them it means service. To you it means dependability. Brainard representatives are located throughout the U.S.; in Canada, P. J. McArthur Company, Toronto.



COMPLETE STRAPPING SERVICE. LIGHT AND HEAVY DUTY STRAPPING. TOOLS AND ACCESSORIES



WRITE: STEEL COMPANY STEEL STRAPPING DIVISION, WARREN, OHIO

How To Reach Them

The thousands of purchasing executives, production chiefs, and engineers, all potential BUYERS of your products are among the readers of *Iron Age*. Your advertisement here can pave the way for your salesmen throughout the metalworking industry.

For information write:

The Iron Age 100 E. 42nd St., NEW YORK 17, N. Y.

— Technical Briefs —

fast or slow. This is an important consideration which is dependent on the engineer's judgment.

"Predetermined-time systems," Duncan continued, provide greater timestudy consistency because they tend to eliminate errors in judgment. Most grievances over timestudy arise from inconsistencies which seldom occur when time values are based on a single table and judgment and emotional aspects of timestudy are minimized."

Stearic Acid on Buffed Parts

Removal of stearic acid, an important part of many buffing compounds, from buffed and polished parts is a constant problem for metal fabricators.

Too high a concentration of an alkaline cleaner in removing stearic acid from zinc does not give as good results as an intermediate concentration, investigators J. Fred Hazel and William Stericker recently found.

It was found that sodium stearate formed and salted out on the work. This reduced solubility under existing highly alkaline conditions.

The film prevented further cleaning from taking place. Many platers have found that the work has not been improved by throwing in several more pounds of cleaner, and in fact has often become worse.

Cleaners used in the tests were sodium hydroxide, trisodium phosphate, sodium carbonate and several types of sodium silicate.

Results of the study "Removal of Stearic Acid from Surface by Alkaline Detergents" have been reprinted by Philadelphia Quartz Co.

Jet Test Stands Replaced

Ten new jet engine test stands, replacing those destroyed in last summer's tragic explosion, will be constructed on a new land site recently acquired by Allison Div. of General Motors.

A new 125,000 sq ft building will be erected on the same site for fabrication and assembly of experimental engines, according to E. B. Newill, general manager.

test proves you get

43% MORE PRODUCTION

with

MO-MAX TOOL BITS

**IMMEDIATE DELIVERY
FROM STOCK**

On three operations in the set-up pictured here—machining nickel-moly steel (4615) at 135 to 150 s.f.m.—the superintendent kept careful records of tool performance. It was found that MO-MAX COBALT High Speed Ground Tool Bits ran 43% to 100% longer than the tool bits previously used. ♦ In the break-down operation MO-MAX ran 4 hours, as compared with 2 hours for the other steel. In facing, it was 5 hours against 3½ hours. In cut-off, 4 against 2½. ♦ This is one of hundreds of tests in which both MO-MAX and MO-MAX COBALT Tool Bits have demonstrated their superiority. So if you have a difficult machining problem, a *Cleveland* Service Representative will be glad to give helpful suggestions. Contact our nearest Stockroom, or . . .

TELEPHONE YOUR INDUSTRIAL SUPPLY DISTRIBUTOR

1876 1951



THE MARK OF QUALITY
FOR 75 YEARS

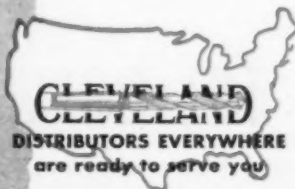
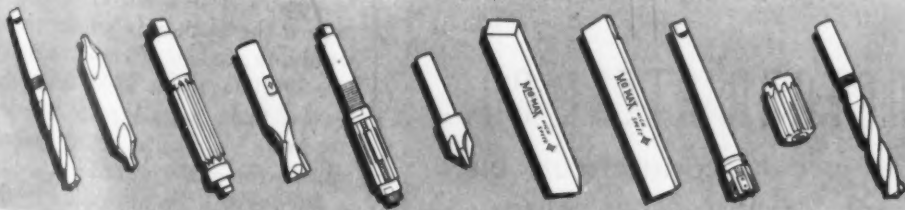
THE CLEVELAND TWIST DRILL CO.

1242 East 49th Street

Cleveland 14, Ohio

Stockrooms: New York 7 • Detroit 2 • Chicago 6 • Dallas 2 • San Francisco 5

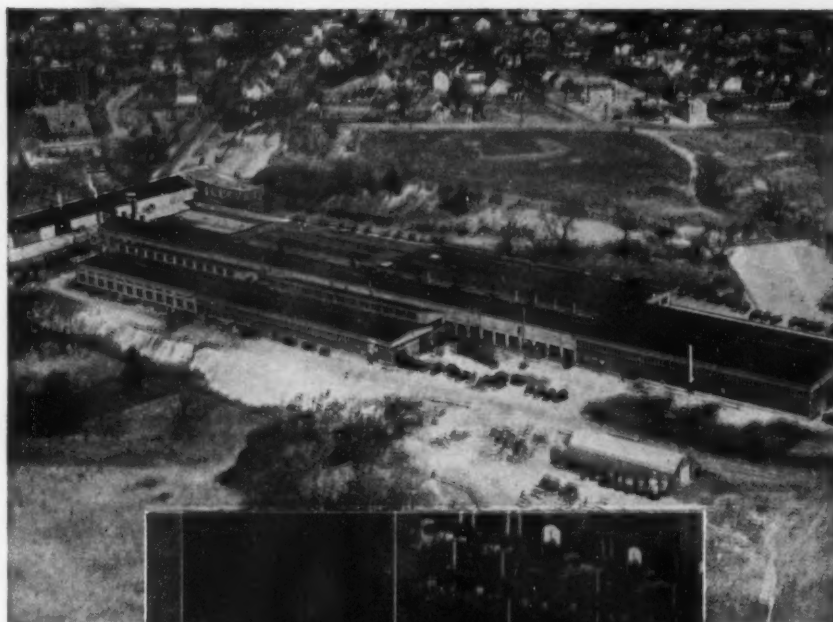
Los Angeles 58 • London W. 3, England



ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER *Cleveland* TOOLS

December 6, 1951

199



In this modern plant skilled craftsmen, modern equipment and scientific controls all combine forces to produce strip steel of consistently uniform quality. Wallingford uniformity means that gage, temper and surface are in all ways and at all times the same. Edges are always smooth and straight, surfaces uniformly clean and flat, widths consistently exact. This uniform quality means savings in preparation time and smoother, faster operation to cut down machine stoppages and minimize rejects.

THE WALLINGFORD STEEL CO.

SINCE 1922



WALLINGFORD, CONNECTICUT, U.S.A.

LOW CARBON • HIGH CARBON
ALLOY • STAINLESS • STRIP and TUBING

Technical Briefs

Shuttle Tips Induction Hardened

Several million textile shuttle tips are being hardened by radio-frequency induction heating each year at the Charles A. Richardson Co., West Mansfield, Mass. The job is being done with higher production rates and fewer rejects than with the old oil-fired furnaces.

With r-f heating, it is possible to "selective"-harden the shuttle tips—24 different sizes of them—at production rates to 3000 per hr.

Selective hardening, by means of exact and automatic process control, produces a high degree of hardness at the point, where maximum wear occurs, and relative softness for toughness.

The carburizing furnaces previously used required 200 sq ft of floor space; the Westinghouse 20-kw r-f generator and integral work-handling equipment require less than 30 sq ft. The equipment is fully automatic, and can be operated by unskilled labor.

The work-handling equipment is arranged for manual loading, with automatic position, hardening, and discharge. A process timer built into the machine controls the positioning, heating, and quenching cycles, and reduces rejects because of uniformity of heat treatment.

Contest Rules Announced

Rules for the annual prize paper contest sponsored by the Resistance Welder Mfrs. Assn. have been announced. Prizes for outstanding papers on resistance welding total \$2,250.

The contest provides an opportunity to those in industry or engaged in research laboratory work to compete for a first prize of \$750, a second prize of \$500 and a third prize of \$250.

Papers from a university source, where the author is an instructor, graduate student or research fellow, are eligible for a \$300 first prize and a \$200 second prize. Undergraduate students may submit papers for a \$50 award.

Judges will be appointed by the American Welding Society and awards will be made in 1952.

SLAB ZINC

every grade of ZINC
for urgent military and
civilian requirements

PRIME WESTERN

SELECT

BRASS SPECIAL

INTERMEDIATE

HIGH GRADE

SPECIAL HIGH GRADE



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

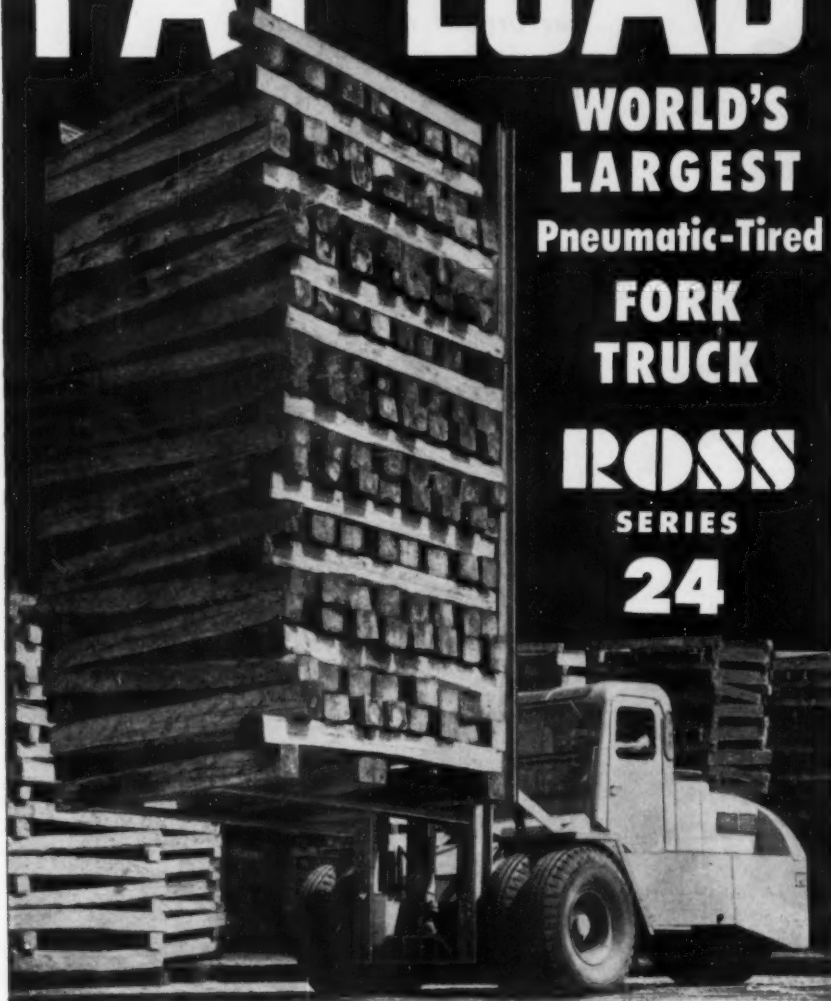
Columbus, O. Chicago St. Louis New York

December 6, 1951

201

PAY LOAD

**WORLD'S
LARGEST
Pneumatic-Tired
FORK
TRUCK
ROSS
SERIES
24**



HANDLES LOADS WEIGHING 26,000 LBS.—72" WIDE

**SPEEDS HANDLING OF BILLETS, BARS, IN-PROCESS
AND FINISHED MATERIALS**

**HUGE 14.00-20 TIRES, PLENTY OF WEIGHT ON DRIV-
ING WHEELS—MINIMUM YARD SURFACING REQUIRED**

TAKES TOUGHEST OPERATING CONDITIONS IN STRIDE

You'll want full details on this giant fork truck... designed to further speed mass handling of heavy materials and reduce costs even more. Write today.



THE ROSS CARRIER COMPANY

Direct Factory Branches and Distributors Throughout the World

425 Miller St., Benton Harbor, Michigan, U. S. A.

Technical Briefs

Internal Cooling:

Ratings of large turbine generators boosted by ventilation method

Ratings at which large turbine generators can be built have been greatly increased by a radical new ventilation technique, according to C. M. Laffoon of Westinghouse Electric Corp.

Benefits of this development also extend to smaller units because a machine of a given rating can be made smaller than with conventional cooling.

Basis of the unusual ventilation technique is to cool the active conductors internally by making them hollow and blowing hydrogen gas at high velocities through these ducts, thus placing the coolant in intimate contact with the material in which the heat is generated.

This method of ventilation has been carefully tested on large size models. The results have warranted its application to two 3600-rpm generators, rated at 175,000 and 200,000 kw to be completed in 1954.

The new ventilation system comes at a fortunate time. The maximum practical rating of turbine generators has, over the years, risen steadily. By increasing hydrogen pressure, by improvements in blowers, in metallurgy, it has been possible to meet new needs.



"This is our inspection department."

WHEN
PRECISION
IS VITAL
specify
Farrel Gears

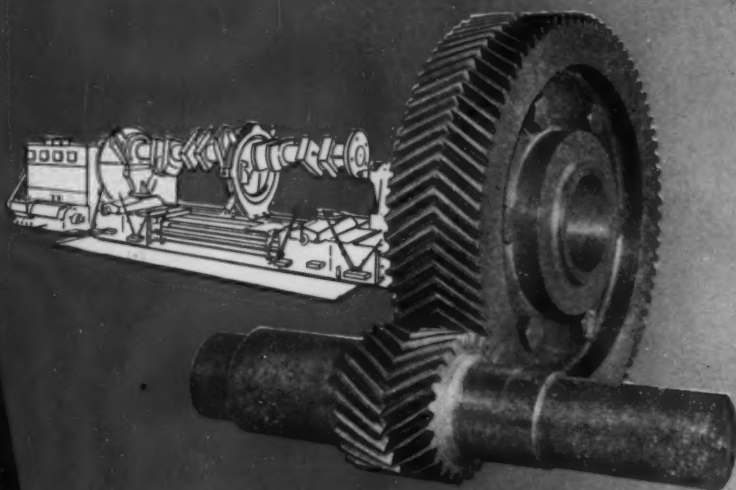
In many machine tools, where accuracy is of primary importance, Farrel herringbone gears are used to transmit a smooth, efficient flow of power to work or tool point.

The quiet, vibration-free performance and long life you can expect from these gears result from extreme accuracy of tooth spacing, contour and helix angle, and other qualities inherent in the Farrel-Sykes method of gear generation. They are made of the finest grade materials, in a complete range of sizes for any power capacity and any application.

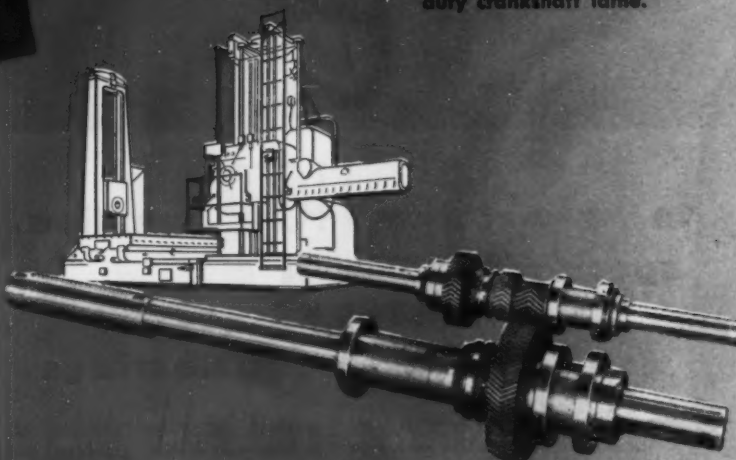
Wherever power transmission must be smooth and vibrationless under all conditions of load and speed, *specify Farrel herringbone gears*. Information and engineering assistance available, without obligation.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

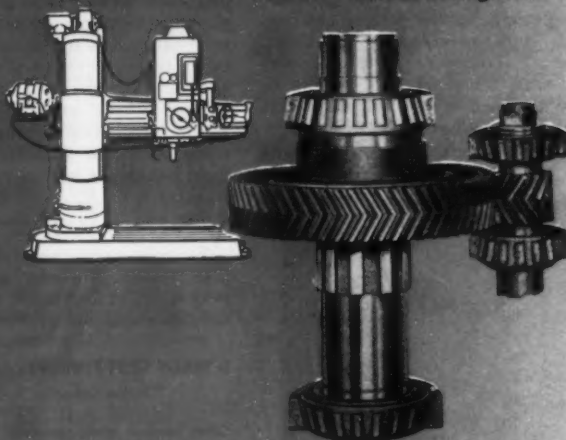
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston,
Pittsburgh, Akron, Cleveland, Detroit, Chicago,
Portland (Oregon), Los Angeles, Salt Lake City,
Tulsa, Houston, New Orleans



Headstock gears for heavy duty crankshaft lathe.

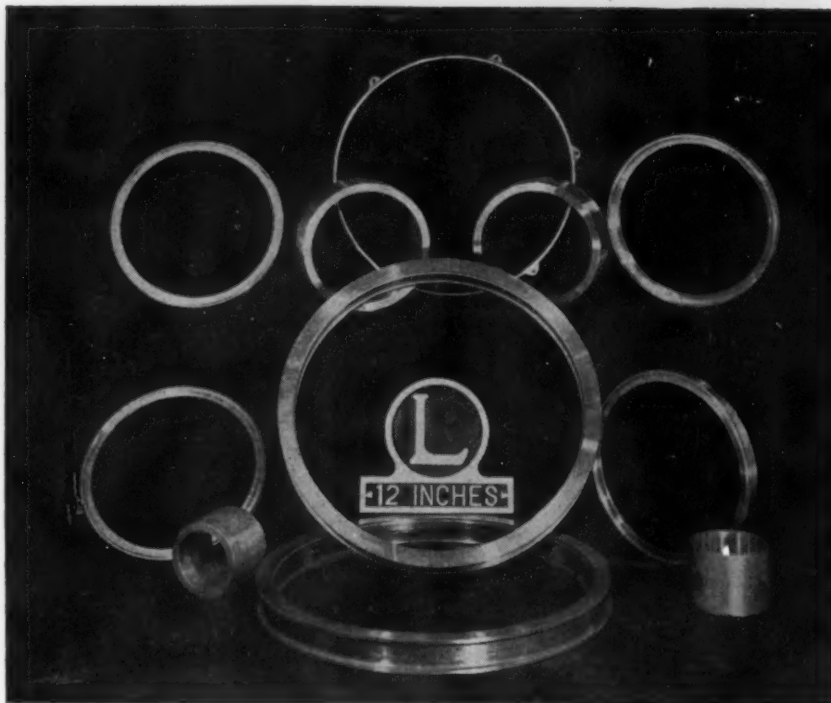


Gears for driving main and auxiliary spindles of a horizontal boring mill.



Spindle gears for a radial drill.

Farrel-Birmingham



to answer the **HOT** question...
specify **LEBANON**
HEAT-RESISTANT
Centrifugal Castings

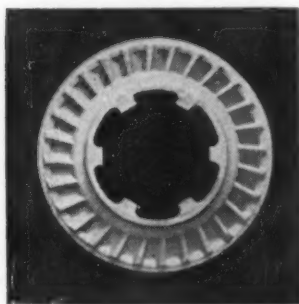
CYLINDRICAL shapes cast in permanent molds by the exclusive Lebanon CENTRI-DIE process, are succeeding where other castings have failed. There are important reasons why Lebanon is able to produce these tough, service-proved castings with such outstanding qualities. First... *Lebanon experience*, covering some 39 years, has taught us how to work with difficult-to-cast heat and corrosion alloys. Second... *Lebanon testing* involves every proved

method (including the use of a million-volt X-Ray machine) to insure absolute structural integrity. Third... *Lebanon exclusive processes*, like our CENTRI-DIE method of casting, were developed to give castings superior physical properties, more uniformity and to retain high resistance to many types of destructive agents. For example, today's jet engines which are subject to extremely high temperatures, depend upon Lebanon CENTRI-DIE castings. Lebanon Castings can be made to meet A.I.S.I., A.S.T.M., A.M.S., Army and Navy specifications.

Write for your copy of the Lebanon CENTRI-DIE Bulletin so that you may have, at first hand, all the facts on this important process.

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In the Lebanon Valley"

Other Lebanon quality products include centrifugal castings produced in refractory molds—illustration shows a typical casting made by this process.



LEBANON Castings
ALLOY AND STEEL

CIRCLE
L

—Technical Briefs—

Packing Tips:

Study of firms packing for military reveals cost-saving methods

Government packing specifications have proved a headache to many defense contractors. Lack of qualified help, shortages of specified materials, and the need for expensive equipment have all caused trouble. Costs are often higher than anticipated.

Based on the experience of many government contractors, the Research Institute of America recently made a number of recommendations to aid packers.

Check packaging specs before bidding. Some companies have found, too late, that their normal packaging methods weren't acceptable. "Extras," such as cleaning and preservation, specially treated papers, etc., plus the added labor they require, can take the profit out of a job. An advance check will give you a chance to figure the cost of any special requirements.

Companies experienced on gov't work won't make a bid until they get a copy of the packaging specifications (available at the office letting the bid). If they can't get a copy before the bid closing date, they state on the bid form that the price quoted does not include special packaging.

Even when "ordinary commercial packaging" is called for, check with the procurement office to be sure that your method is acceptable. Lack of agreement on exact requirements can cause a run-in with the inspector later.

If you deviate from specs, get approval first. Occasionally, over-elaborate methods may be prescribed. When this occurs, a conference with the contracting officer and the inspector may result in permission to deviate from the specification. Get this in writing.

If you find an adequate substitute material for one in short supply, the same approach may crack a bottleneck—and avoid serious delays in delivery.

Instruct subcontractors on packing requirements. Many com-

panies overlook this point and get involved in costly repacking operations.

Test surplus materials before using them. World War II surplus stocks are still available and often offer good buys. But some companies have had trouble with inspectors—grease proof papers, for example, often lose their pH rating and grease proofness after several years.

Are packaging personnel well trained? The Ordnance Dept. has a training center at Forest Products Laboratory, Madison, Wisconsin, for military and industrial packaging people.

Additional schools are being established by the Dep't of Defense. Companies supplying a variety of items for military use may find it worthwhile to send shipping Dep't foremen to these centers.

If you want to enroll an employee in a gov't packaging school, write for an application to: Munitions Board, Packaging Agency, Washington 25, D. C.

Servomechanisms:

Study of application techniques aids industrial process control

The servo techniques, widely used in process control to improve product quality, offer a powerful tool for expressing control problems in terms of numbers, according to a recent study by S. P. Higgins, Jr., and G. W. McKnight.

Servo analysis methods can be applied to process control problems to obtain useful and reasonably accurate prediction of performance. When applied, the methods may perform many useful functions. Among these are:

To allow predictions of system performance to be made from tabulated information on the individual components of the system.

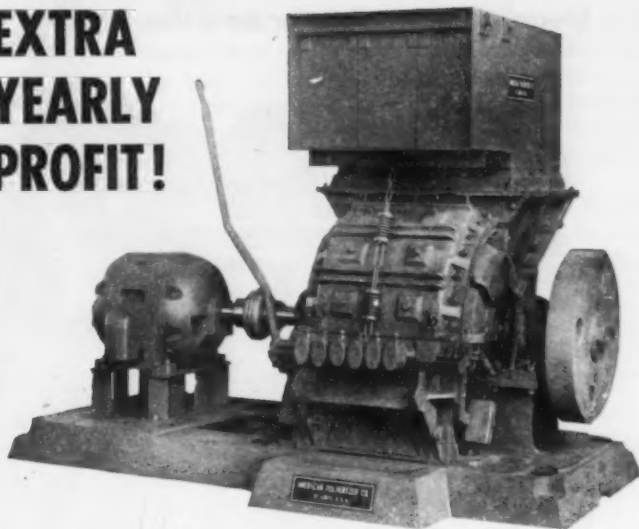
To establish the necessary response characteristics which an instrument or process being designed must have in order to make the complete system into which it is installed operate as desired.

To allow the designer to deter-

More "CRUSHING" FACTS ON *American* CRUSHER PERFORMANCE

\$120,000

EXTRA YEARLY PROFIT!



5 *American* Metal Turnings Crushers Provide 3 Profit Sources:

1. **Top Scrap Value.** With a battery of five American #3800 Crushers a well-known bearing manufacturer processed over 30,000 tons of metal turnings in one year. With shovelling chips bringing \$4.00 and more per ton on the scrap market . . . this volume would produce an additional gross profit of over \$120,000.00!
2. **Cutting Oil Recovery.** A bonus saving . . . since greater quantities (up to 50 gallons per ton) are released when turnings are reduced to chips and handled in a chip wringer.
3. **Easier Handling and Storage.** American-reduced chips save up to 75% on valuable storage space. Chips are easier to handle, too . . . permit faster, heavier loading in freight cars.

WRITE for Metal
Crushing Bulletin.



American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVENUE

ST. LOUIS 10, MISSOURI

THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: 1/2 to 40,000 HP—1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

**BACKLASH
FRICTION
WEAR and
CROSS-PULL**
are eliminated
LUBRICATION IS
NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES
PERFECT BALANCE UNDER ALL
CONDITIONS OF MISALIGNMENT.

• • •
NO MAINTENANCE PROBLEMS.

• • •
ALL PARTS ARE
SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Technical Briefs

mine the source of undesirable effects and to minimize their effect, either by a change in process or instrumentation or by intelligent compromises.

To allow comparison of the performance of various processes as well as other components where a number of choices are available.

To provide a means of cataloging previous experience.

As information is gained, valuable predictions as to "noise" effects on a process and how processes can be improved can be obtained directly from the transfer function. Naturally practical experience is of tremendous importance for this type of work.

Performance can be predicted so that in the selection of equipment, performance may be discussed along with the other important factors such as the economics, convenience, maintenance, servicing, etc.

Engine Parts Reduced

A four year program to standardize the high-mortality parts of gasoline engines used by the Army, the Navy and the Air Force is nearing completion.

Maximum interchangeability is also being achieved. An advisory committee made up of top industrialists charted the program for the Munitions Board, under direction of the Army Engineers.

Manufacturers of engines and parts soon will be invited to a meeting at which the outcome will be explained.

On 138 different engine models 1187 different fast-moving parts could be reduced to a family of only 63 parts; and 15 bore sizes could be reduced to five basic sizes. The program will be expanded to cover diesel engines.

Study Titanium Machining

Studies to determine tool life, surface finish, and machining qualities of titanium are being conducted at the New York University College of Engineering according to a new report. The studies are sponsored by the Kennecott Copper Corp.

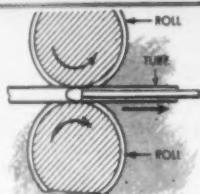
let's
take a
CLOSER LOOK
at

Surface Finishes

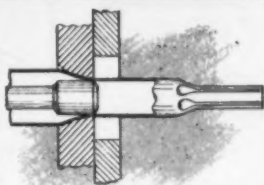


If you machine or fabricate hollow parts from tubing, chances are you have one or more *finishing* problems. Perhaps you can *start* finishing right in your own purchasing department by specifying the type of mill-finish best . . . and most economically . . . suited to your end-use requirements.

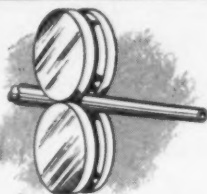
As a specialty tube mill, B&W can supply mechanical tubing with any of the following finishes—as an integral part of the manufacturing process:



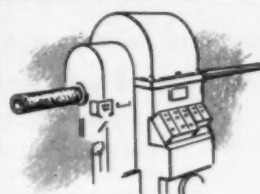
HOT-FINISHED
bears the scale formed during hot fabrication or heat treatment.



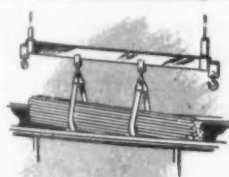
COLD-DRAWN
smooth, scale-free surface.



ROCKED
smooth surfaces, obtained by special sizing and finishing process.



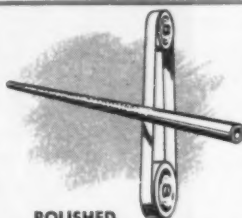
TURNED
machined, uniform O.D.



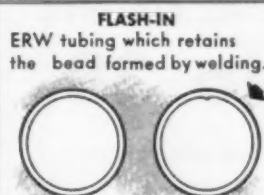
PICKLED
de-scaled by one of several solutions.



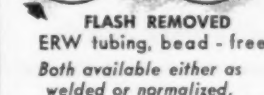
SHOT- OR SAND-BLASTED
O.D. and/or I.D. scale is removed by blasting.



POLISHED
O.D. and/or I.D. polished to one of several specified degrees of smoothness.

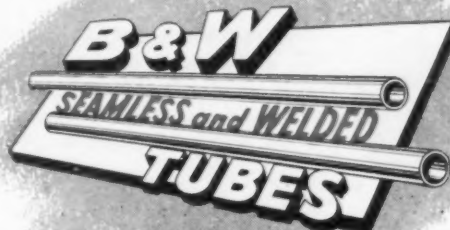


FLASH-IN
ERW tubing which retains the bead formed by welding.



FLASH REMOVED
ERW tubing, bead-free. Both available either as welded or normalized.

Remember—tubing is not just bar-stock with a hole in it, but a semi-finished product, having a wide range of optional finishes, tolerances, chemical and mechanical properties. Ask Mr. Tubes—your B&W Tube Company representative—to help you select the tubing best suited to your particular applications.



THE BABCOCK & WILCOX TUBE COMPANY

Executive Offices: Beaver Falls, Pa.

General Offices & Plants

Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

Sales Offices: Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill. • Cleveland 14, Ohio • Denver 1, Colo.
Detroit 26, Mich. • Houston 2, Texas • Los Angeles 15, Calif. • New York 16, N. Y. • Philadelphia 2,
Pa. • St. Louis 1, Mo. • San Francisco 3, Calif. • Syracuse 2, N. Y. • Toronto, Ontario • Tulsa 3, Okla.

TA-1639M

Wyandotte Metal Cleaner No. 38 Puts POWER in power washing machines

Parts coming out of pressure spray washing machines when Wyandotte Metal Cleaner No. 38 is used are better cleaned because Metal Cleaner No. 38 has the high detergency to put power in your washing machine. Yet it is well inhibited. Metal Cleaner No. 38 gives improved rinsing and long solution life.

A versatile job shop cleaner, No. 38 is an excellent electrocleaner for zinc base die castings, brass, copper and steel.

Why not call your Wyandotte Representative for further details? He can make recommendations that will give you the best results, regardless of the process you are using.

P. S. If you have a cleaning problem, write Wyandotte for free technical information and help.

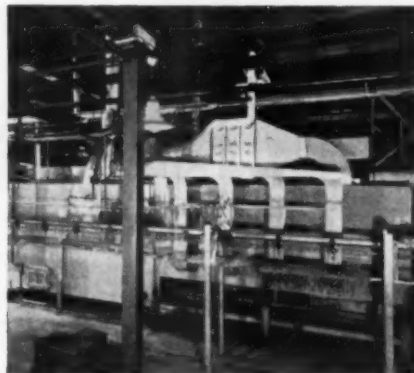
METAL CLEANER

No. 38

*Has high detergency
Is well inhibited
Is exceptionally versatile
Is economical—long solution life*



WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN
Service Representatives in 88 Cities



THE WYANDOTTE LINE—products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray-booth compounds. An all-purpose floor absorbent: Zorball. In fact, specialized products for every cleaning need.



Wyandotte
REG. U. S. PAT. OFF.

—Technical Briefs—

Alloys:

Use of porcelain enamels to conserve high alloys described . . .

Reduction of high alloys in aircraft engines, through application of high temperature porcelain enamel coatings, is being sought by the U. S. Air Force Power Plant and Materials Testing Laboratories at Wright Field, Lt. Col. R. A. Jones recently told members of the Porcelain Enamel Institute.

High temperature porcelain enamels which function at temperatures of 1600° to 1800°F under severe vibration and thermal stress and shock conditions are being used in turbo-jet engines.

These porcelain enamel coatings are being used to protect a high alloy used for its high physical properties. A saving is gained as a result of greatly extended service life.

Porcelain enamel coatings such as these are being used on nearly all sheet metal parts including tail exhaust cones, tail pipes, compression chamber interliners and directive vanes.

On long range rockets, temperatures of 5000° to 7000°F are experienced in combination with 200-500 psi compression.

Ceramic bodies rather than porcelain enamel are used in these conditions but a large field may be opening up in the porcelain enamel coating of regenerative and cooling portions of the mechanisms.

Uses were also cited in connection with rocket power plants and aircraft rocket cylinders used in take-off assistance and otherwise.

The use of high temperature porcelain enamel on reciprocating engines is well advanced and the majority of exhaust headers, collector rings, exhaust pipes and supercharger intake rings used in connection with reciprocating engines would continue to use porcelain enamel coatings in an effort to extend service life of these parts and to conserve high alloy material.

Big Dragline:

Lean English ore will be taken from Corby pit with new machine

The biggest walking dragline in the world has been put into operation at Corby, England, to strip 100 ft of overburden from local iron ore.

The 1792-ton machine is controlled by one man. The ore will feed the blast furnaces at Stewarts Lloyds' big Corby plant.

Plans are to uncover some 448,000 tons of ore a year. Estimated life of the one bed is 33 years.

Lean local ore has a market value of only 94¢ per ton.

Motors will be electrically powered and obtain current through two trailing cables. It walks, under its own power, with 7 ft steps. Cycle for each step takes about half a minute.

The dragline will operate 20 hours a day. Illumination is provided by floodlighting. The bucket weighs 22 tons and holds about 27 tons of spoil when full. The cycle for filling, discharging, emptying and returning the bucket is about sixty seconds.

A 282 ft jib was built of steel tubes. In working position the jib head is 175 ft above ground. Weight of the jib framework is 94 tons.

Compressor Uses Bronze Forgings

Bronze forgings used in compressor parts made by Davey Compressor Co. of Kent, Ohio, have contributed greater strength at lower cost, a recent study shows.

Manganese bronze forgings are used for the buffer cage and valve seat in the cylinder head. These parts are subject to operating temperature of from 265°F to 450°F. Because of the dense grain structure, the forgings achieved greater strength over the castings previously used.

Vibration has also been "engineered out" of the compressors by modern frame design, scientific weight distribution and automotive type springing. Perfect "matching" of engine and compressor contribute to elimination of shaking and shimmying.

Towmotor Mass Handling Triples Storage Capacity In Modern Warehouse

FT. WORTH, TEX. (TNS)—Stacking heavy cases selling high has tripled storage capacity, and increased handling efficiency in the modern warehouse.

Production Costs Cut 60% By Towmotor Mass Handling

Inventory control, streamlining, forecasting, and analyzing all the functions of the handling has resulted in a 60% reduction in production costs.

INCREASED PRODUCTION IS RESULT OF TOWMOTOR MASS HANDLING EFFICIENCY

TRENTON, N. J. (TNS)—Productivity per man-hour reached an all-time high when a fleet of Towmotors was introduced at the Trenton plant. The fact is that today, the plant is running at a pace that is economically sound, efficiently and economically, mechanized in the economic mechanism.

LATE BULLETIN: Film, "What Makes It Tick," Acclaimed By Top Management

CHICAGO, ILL. (TNS)—Top production and material handling executives in the Chicago area enthusiastically approved the new film, "What Makes It Tick," a night at the Towmotor plant.

The NEW TOWMOTOR...

industry's handling headliner!

There's nothing but good news about handling costs when the NEW Towmotor line-up makes the headlines. Five new Towmotor models add greater-than-ever versatility to every phase of handling in America's most important industries. New features assure greater maneuverability; new design provides increased stability with full rated loads. Pneumatic, cushion or solid rubber tires provide speed with safety over any type of surface, inside or out. Capacities: 2,000-3,000 and 4,000 lbs. Complete details of the NEW Towmotor are clearly shown in a new 15-minute film, "WHAT MAKES IT TICK." It's available now for a showing in your office at your convenience. Plan now to see it. *Send the coupon today!*

SEND COUPON TODAY for a showing of "What Makes It Tick" in your office. 15 minutes of helpful information with no obligation to you!

CHECK THESE HEADLINE FEATURES

- Shorter wheel base increases maneuverability
- Larger tires assure easier handling
- Larger steer wheels for better control
- Quiet as a deluxe car
- Double Universal joint eliminates shock
- Heavy duty, air-cooled clutch
- Forced feed lubrication
- Specially engineered Towmotor transmission; 2 speeds forward and reverse
- Powerful hydraulic brakes
- Engineered for constant, 'round-the-clock service on heaviest lifting jobs

TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS

RECEIVING • PROCESSING
STORAGE • DISTRIBUTION



HOW MANY PEOPLE HAVE YOU TALKED TO ABOUT AMERICANISM TODAY?

TOWMOTOR CORPORATION

Div. 15, 1226 E. 152nd Street, Cleveland 10, Ohio

I want more information about the NEW Towmotors. I would like to see "What Makes It Tick" in my own office. Please send details.

Name _____

Company _____

Address _____

City _____ State _____

Representatives in all principal cities in U. S. and Canada

NEW



WILLSON®

DUST HOOD

Lightweight and Comfortable

Can be used with any WILLSON single filter respirators for dusts, mists, gases, vapors. Available without respirator.

Wide Vision, acetate windows — 33 square inches.

Windows interchangeable, replaced in a matter of seconds.

Canvas hood with snap fasteners on window.

Straps with spring clips to gather hood around body and under arms.



Style 1



Style 2 with No. 46 Respirator

See your WILLSON distributor or write us direct
WILLSON PRODUCTS, INC., 231 Washington Street, Reading, Pa.
 Dependable Products Since 1870

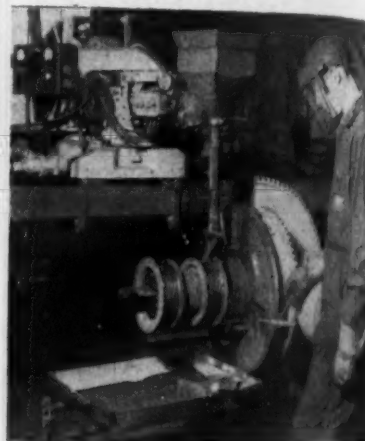
Technical Briefs

Tractor Rolls:

Welding machine and new fixture cut rebuilding time . . .

Worn out tractor rolls are being rebuilt in a fraction of the time usually required with the aid of a special positioner and welding machine at Alloy Hard Facing Co.

Rolls are mounted on an axle placed in a welding positioner which rotates the rolls at the proper speed for welding. A Unionmelt welding machine runs on a track above and parallel to the axle. In making the build-up, weld metal from a high-carbon rod is deposited on the roll surface to a depth of $\frac{3}{8}$ in. in three overlays.



TRACTOR ROLLERS are quickly salvaged on special welding machine.

As the roll completes each revolution, the welding machine is advanced a small distance laterally so that flat overlapping beads are produced across the face of the roll.

In welding operations, granulated welding composition is automatically laid down on the work ahead of the welding rod. High-carbon rod $\frac{5}{32}$ in. in diameter, is fed automatically to the welding zone from a coil.

Welding takes place without flash, glare, or spatter, and it is unnecessary for the operator to wear goggles or a welding hood.

On cooling, the fused composition snaps off by itself, or is removed by tapping with a hammer. The welds are smooth enough so that no further finishing is required.

The tractor rolls are $8\frac{1}{2}$ in. in diam and are welded at a speed of

about 30 in. per min produced by turning the rolls at about one rpm welding current is 300 to 325 amp at 25 v.

Tractor idler rolls are also rebuilt in this way, using similar welding materials and conditions. In reclaiming idler rolls, the sides of the center ridge are rebuilt by manual arc after the two faces have been rebuilt by machine welding.

Surfaces of the rebuilt rolls have a hardness range of 200 to 275 Bhn. In use, this deposit work-hardens with typical deposits attaining a hardness of 325 Bhn.

Under normal conditions, one face of the 8½ in. diam roller can be rebuilt in about 40 min. Depending on the amount of roller wear, one operator can rebuild from five to ten rollers a day.

Casting Method Saves Money

A combination rolling mill spindle and coupling box cast by the Stroh Process has enabled a major steel producer to make cash savings of 83 pct over a 6-month period. Elimination of down time permitted further savings in production time.

A study showed coupling boxes and spindles were wearing out at the rate of one box and one spindle per month. The combination unit gave 6 months' service on the same rolling mill stand.

The Stroh Process Steel Co.'s casting method by which the combination unit was produced involves casting of a tough, austenitic steel alloy on a base of plain carbon steel.

Since the depth, thickness, degree of hardness and location of the alloy can be controlled exactly, it was applied only to the spindle wabblers and the pods of the coupling-box end.

This provided a piece of equipment with the wearing characteristics of a high grade steel casting at a cost only slightly above a plain carbon steel casting.

In the process the alloy cannot come loose from the base metal.

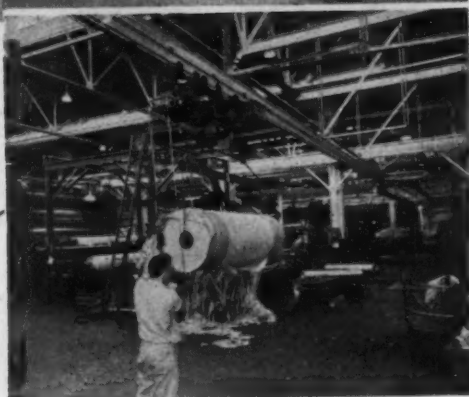
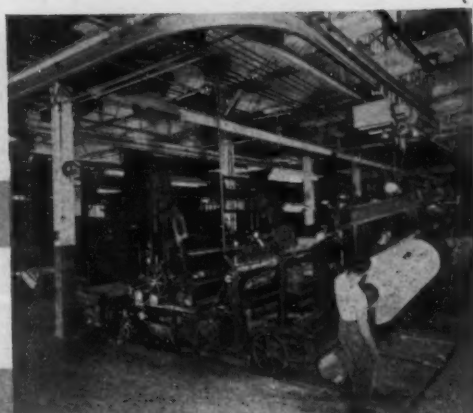
IT TOOK

"BACKACHE"

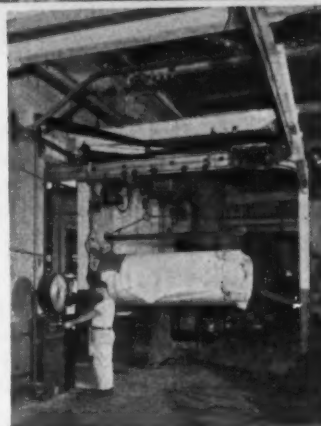
AND

"HEADACHE"

OUT OF
HANDLING



This American MonoRail Overhead Handling System entirely eliminated all problems previously encountered. The system, consisting of 1650 feet of track, 8 carriers with electric hoists and MonoTractor drive, a power-operated crane, three track scales and the normal complement of track switches, produced the following improvements:



1. Operator fatigue was greatly reduced.
2. Traffic flowed freely—no aisle congestion.
3. No side-tracking during travel—time saved.
4. Loads automatically weighed—no transfer to scales.
5. Damage to floors completely eliminated.
6. Damage to load greatly reduced.

Let an American MonoRail engineer show you how it can be done in your plant, at no obligation, of course. Send for C-1 Bulletin.

THE AMERICAN **MONORAIL** COMPANY

13103 ATHENS AVENUE

CLEVELAND 7, OHIO

Fate? No-NEGLIGENCE!



LET'S nail it down. Too many of the fires that cost industry millions of dollars every year are acts of negligence. Of putting off till tomorrow and then ducking the issue of proper fire protection.

In most plants—and this probably includes *yours*—there are operations, equipment and processes that are "key" hazards. Here fire can start fast or cause losses in equipment and production far beyond its immediate property damage. For such hazards only the most powerful specialized protection is sufficient.

To provide such protection CARDOX developed "Low Pressure Carbon Dioxide Systems"* years ago... made it practical to apply tons-a-minute of CARDOX CO₂ as readily as a few pounds, to stop big fires fast and keep small fires from becoming big. By holding fire damage to a minimum and eliminating extinguishment damage entirely CARDOX Systems have reduced industry's fire losses by many millions of dollars.

Why not let us show you how CARDOX can eliminate fire as a major threat to continuous operation? First step is a survey of your hazards and a frank report by a CARDOX expert. Please write us and we'll arrange it.

*Covered by Patents Issued & Pending

CARDOX
ORIGINATOR OF **Low Pressure CO₂**
FIRE EXTINGUISHING SYSTEMS

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS
Offices in Principal Cities

—Technical Briefs—

Testing:

Methods cuts research testing from 3 months to 10 hours...

A rapid, accurate way for testing steel alloys, other metals and plastics to find out how long they will stand up under normal loads when used as moving parts has been developed by two scientists at Rensselaer Polytechnic Institute.

Test apparatus assembled by Dr. Joseph L. Rosenholtz and Prof. Dudley T. Smith makes possible the completion in 10 hours or less of a testing job which formerly required 3 months or longer on costly machines.

The Dilastrain Method, soon to be available under an RPI licensing plan, is based on precise measurements of the extent to which specimens will expand under controlled temperatures.

Industrial researchers want to know the endurance limit of each new material used for dynamic moving parts.

The endurance limit, under methods presently employed, has been found by subjecting test bars to varying loads or stresses and vibrating them until they either give way or prove enduring.

Ordinarily this takes 3 months or longer since a half-billion cycles, or complete vibrations, may be set as a practical limit for testing materials which have been designed for moving parts of machines.

The method requires identical specimens of the material be placed under stress in a definite range. They are then put through an equal number of cycles of vibration so that all will be on an even level of fatigue.

Specimens are then subjected to controlled temperatures ranging from 20° to 100°C.

Specimens all have the same length, about 2 inches, to start with but as temperatures are stepped up each specimen changes in length in proportion to the

amount of stress to which it has been previously subjected.

The apparatus automatically magnifies the amount of each expansion 3500 times and records it. In approximately 2 hours the total linear expansion of all test specimens has been recorded.

When these values are plotted against the stresses previously applied to the specimens, it is found that a sharp dip in the resulting curve appears at the point where the test material reaches its endurance limit.

Tests were run on a chemically complex steel alloy supplied by the Allegheny Ludlum Steel Corp. The endurance limit was determined more accurately than by ordinary methods.

Gage Measures Hull Thickness

Ship hulls thinned by corrosion can now be measured without drill-holes through use of an ultrasonic gaging device.

Thinning by corrosion has long been a problem for ship owners. At times it has been necessary to drill up to 500 holes in a vessel when age dictated a thorough examination.

Non-destructive testing to eliminate this hole drilling was studied by Sam Tour & Co., Inc.

The result is the ultrasonic Audi-gage for non-destructive determination of thickness. Handled by experienced engineers, the equipment is eliminating drilling of holes in hulls and bulkheads.

Packaging Standard Proposed

A proposed simplified practice recommendation for the packaging of standard malleable iron pipe fittings has been submitted to the manufacturers and others interested users for acceptance or comment by the U. S. Dept. of Commerce. Purpose of the recommendation is to establish a simplified schedule of standard quantities per unit package.

Copies of the proposed recommendation may be obtained from the Commodity Standards Division, U. S. Dept. of Commerce.

ATLAS

FOR STRIP HANDLING EQUIPMENT

● Strip steel can be handled very economically on rail cars as compared with other means of conveyance. Strip cars can be handled by heavy-duty rubber tired tractors or by locomotives running on the track rails, or they can be self-propelled motor-driven with power supplied by storage battery in the car.

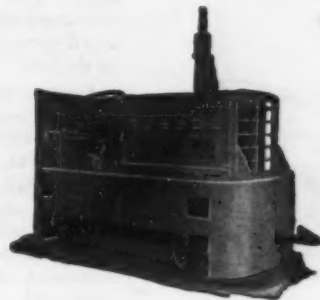


125-Ton DOUBLE TRUCK CAR

for handling steel strip in rolls. This car is hauled by tractor shown below.

SPECIAL HEAVY-DUTY GAS-ELECTRIC TRACTOR

for hauling 125-Ton Strip Handling Cars. Tractors run on rubber tires.



135-Ton FLAT CAR

Powered by storage battery for handling sheet steel.

25-Ton PLATFORM CAR

Powered by storage battery, operates at slow speed and has operator's platform at each end.



**ATLAS ENGINEERING SERVICE
IS ALWAYS AT YOUR SERVICE**



THE ATLAS CAR & MFG. CO.

ENGINEERS

MANUFACTURERS

1140 IVANHOE RD.

CLEVELAND 10, OHIO, U. S. A.



SKILLED LABOR

at the CROSSROADS of the East

As one of the leading industrial states in the country New Jersey offers a labor force commanding a wide range of skills. This is reflected in the unusually high value of manufactured products per wage earner which is evident in all surveys concerning the labor force of the Crossroads of the East.

Latest available statistics show that 59 per cent of the State's non-agricultural workers are employed in manufacturing industries. Out of every 1,000 inhabitants, 164 work in factories. Few states, if any, can match these figures.

New Jersey's many advantages and high degree of economic stability have proved attractive to almost every type of industry, both large and small. Contributing factors to the favorable environment are the existence of numerous plants that turn out a variety of semi-finished parts and sub-assemblies to augment the operations of other plants, as well as an abundant availability of basic supplies and specialties within overnight delivery distance from nearby states.



Write for your copy of the new digest about New Jersey, "An Industrialist's View of the Crossroads of the East." Box G, Public Service, 70 Park Place, Newark, N. J.

PUBLIC SERVICE
ELECTRIC AND GAS COMPANY
NEWARK, N. J.



LOOKING FOR SUBCONTRACTORS?

You'll find many subcontractors in the advertising pages of *The Iron Age*. And, on pages 261-264 of this issue is CONTRACT MANUFACTURING, a directory of specialized production services.

Technical Briefs

Slab Shear:

New unit installed in Austrian mill has novel design features

An electrically operated hot bloom and slab shear recently installed by the Alpine Montan Co. of Austria at their Donawitz Plant has several unusual features.

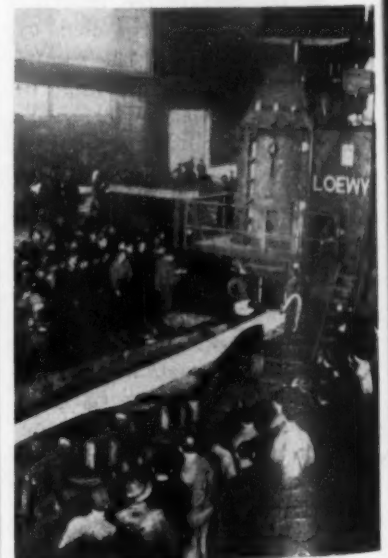
The shear, designed by Loewy Rolling Mill Div. of Hydropress, Inc., New York, operates in conjunction with a modern 44 in. blooming and slabbing mill. The shear handles hot blooms up to 16 x 16 in. or slabs to 40 x 6 1/2 in. A shearing force of 1150 tons is exerted.

Driven by two 300 hp electric motors this mechanically simple upcutting shear operates from the standstill without flywheels or clutch. It is electrically controlled.

A variety of cutting speeds and an electrically adjustable knife opening combine to permit quick adaptation for the cutting of various sizes of material, making the shear extremely versatile.

The knives are supported along their entire length in a solidly constructed carrier, eliminating undue bending stresses caused by overhung loads.

The lower knife carrier is acti-



HOT BLOOM and slab shear at Alpine Montan Co., Austria, has shear force of 1150 tons, unusual design features.

vated by a system of levers arranged to absorb all working stresses and leave the shear frame proper free of any stresses during cutting.

The bloom or slab is controlled by a spring loaded hold-down which clamps the material in place while cutting, and releases it as soon as the lower knife has descended sufficiently to let the material pass between the blades.

With electrically operated push-off arms placed in front and back of the shear knives and allowing quick disposal of the crop ends, the shear is immediately ready for the next cut.

The shear frame is designed to allow free access to all parts for inspection and maintenance, and in particular the open shear throat can be easily reached by the operator.

New Extrusion Catalog Prepared

The Air Force's new extrusion die catalog provides a cross-reference engineering handbook for design availability and interchangeability of extrusion dies used by aircraft manufacturers.

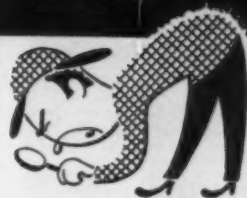
"Aircraft Extruded Shapes—Aluminum and Magnesium Alloys" is planned as a comprehensive reference list of extrusion die numbers for extruded shapes used by manufacturers participating in the Air Force-Navy-Industry aircraft extruded shapes program. It will be available by summer of 1952.

Report on Cathodic Protection

Authentic recommendations for correlating cathodic protection systems on underground metallic structures are given in the "Report of the Correlating Committee on Cathodic Protection," which has been published by the National Association of Corrosion Engineers as a service to industry.

The report consolidates and revises the four bulletins prepared by the committee to aid in solving the problems created when adjacent underground metallic cables, pipe lines and rail tracks are protected from corrosion by applied cathodic currents.

Looking for MILITARY PACKAGING?



DOBECKMUN

*
"Metalam" and "Benbar" Government approved for:

JAN-P-117, Types I and II
Grade A, Classes A, B, C

JAN-B-121, Types I and II
Grade A, Class 1

JAN-P-131, Amendment 3, Type I
Classes A and B

AN-B-20, Type II
(MIL-C-6056) (MIL-E-6060)

Consult us on your needs for flexible packaging, either with government-approved materials or engineered to your specific requirements.



THE DOBECKMUN
COMPANY

Cleveland 1, Ohio

LOCK
JOINT

Now You can fill your needs

with HELICAL TUBING



Specialty



Welded and Cold Drawn
Stainless Steel Tubing

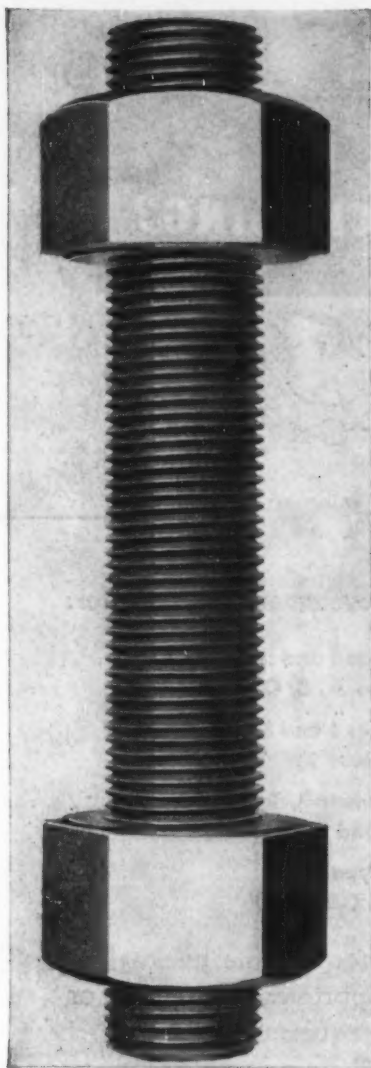
Special Purpose Tubing In All Available Materials

As Welded

For full detailed information about Helical Tubing send today for your HETCO Catalog.

HELICAL TUBE CORPORATION

19 Washington St., East Orange, N. J.
Manufacturing Plant—Grand Rapids, Michigan



WHEN IT'S *Special* BOLTS and STUDS

Send your Specifications to

ERIE

37 years' experience in
making special bolts, studs,
nuts for specific job
requirements.



Technical Briefs

Fission Products:

Technical, economic problems must be met . . . Many potential uses.

Many technical and economic problems must be solved before fission products, by-products of atomic energy, can be made available to fill the potentially large industrial demand.

These are the conclusions of Stanford Research Institute in a recent survey of industrial uses of radioactive fission products conducted for the United States Atomic Energy Commission.

Millions of curies of radioactivity are contained in process wastes left over from production of plutonium in the AEC's nuclear reactors. Of no usefulness for industrial or explosive power or as a heat source, these products are a potential source of large quantities of low-cost radiation.

Refinement and concentration of the gross fission products, now stored at AEC installations, will be necessary to make them suitable for industrial purposes.

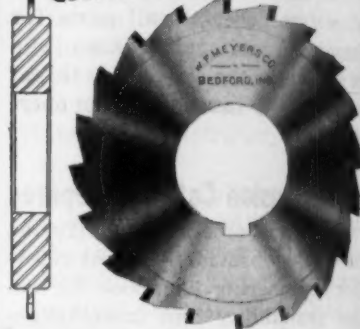
Present commercially feasible uses include activation of phosphors for self-luminescent signs and markers, static eliminators for a variety of industrial processes, reduction of starting voltage requirements in fluorescent light tubes and in process control.

Possible future uses for fission products include industrial radiography, cold sterilization of drugs and foods and portable low-level power sources. In the highly speculative area where basic technical knowledge is lacking, possibilities exist for uses in radiation chemistry and flame propagation.

Heat-sensitive drugs, pharmaceuticals, and medical supplies are a promising potential market for cold sterilization with gamma rays, the report points out. This is due to the high cost of present methods of assuring sterility in heat-sensitive materials, the improved certainty of sterilization by radiation, and the high value of the end-products.

PRECISION CIRCULAR CUTTERS

MEYCO CARBIDE TIPPED

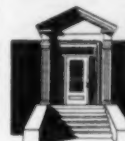


MEYCO SOLID CARBIDE

MEYCO saws and cutters in various diameters and thicknesses can be furnished to your individual specifications. MEYCO cutters have earned an enviable reputation where long tool life and precision are a must.

Increase production in your slotting, venting and slitting operations by using MEYCO cutters. Please furnish complete specifications and quantities desired when requesting prices and indicate material to be cut.

Manufacturers of precision tools since 1888



W. F. MEYERS CO., INC.
BEDFORD, INDIANA

—Technical Briefs—

Health:

Antidote for beryllium poisoning reported at ACS Meeting . . .

The first successful antidote for beryllium poisoning has been reported to the American Chemical Society by Dr. Jack Schubert of the Argonne National Laboratory.

Beryllium, formerly used in fluorescent lamps and now employed as a source of radioactivity in the atomic energy program, has only recently been recognized as the cause of an insidious, slowly-developing disease.

A compound known as ATA has been found to be a nearly perfect antidote for otherwise fatal doses of beryllium compounds in animal experiments. ATA also gives protection when administered to animals before exposure to beryllium.

A lightweight, durable metal, beryllium is under investigation as a possible construction material for atomic piles.

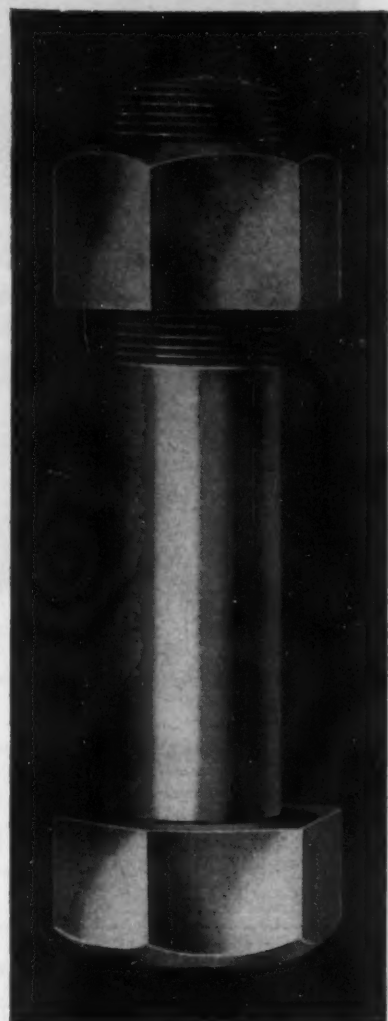
Poisoning results from the presence of small amounts of beryllium metal or beryllium compounds in the body, Dr. Schubert explained. Inhaled beryllium damages the lungs. No successful cure for the disease is known although temporary improvement in many patients has been obtained by the use of ACTH.

Clad Sheet Saves Copper

As much as 80 pct of critically short copper can be saved by "cladding" it as a coat on a base of steel, Joseph Kinney, Jr., president of American Cladmetals Co., believes.

The sandwich of metals has copper as the surfaces with steel in the middle. The metals are rolled together in sheet form and permanently bonded. The copper surfaces provide the performance of solid copper sheets although the clad-metal is mainly composed of carbon steel which is not only more plentiful but stronger than copper.

Conservation of metal by "cladding" a scarce metal on top of a more plentiful metal is not new. Stainless steel has been conserved for some time by being clad on top of steel.



WHEN IT'S *Special* BOLTS and STUDS

Send your Specifications to

ERIE

37 years' experience in making special bolts, studs, nuts for specific job requirements.



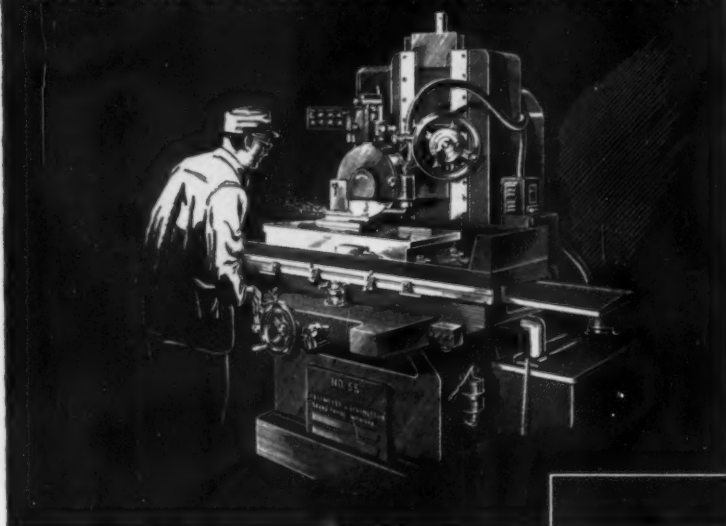
Representation in Principal Cities

Greater Tonnage
Per Edge of Blade

A

**AMERICAN
SHEAR KNIFE CO.**
HOMESTEAD · PENNSYLVANIA

WHEN THE DECISION IS PRECISION...



Where extreme tolerances are not required, the choice of any particular grinding machine may not be too important. But, where absolute precision is demanded, the choice is usually *Grand Rapids*.

Defense orders make it impossible to fill orders as quickly as we desire—but we know our customers can appreciate the reasons for delay. As always we'll do our best to serve you.

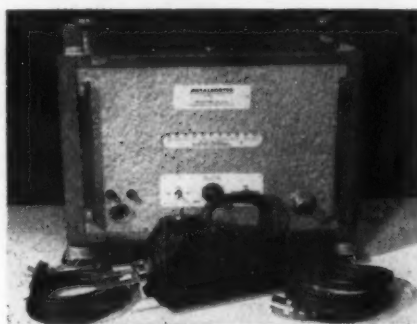
GALLMEYER & LIVINGSTON CO.
200 Straight Ave., Grand Rapids, Mich.

Grand Rapids Grinders

—World's finest



NEW METALSORTERS



UNLIKE MOST TESTING METHODS, METALSORTER RESULTS ARE NOT SUSCEPTIBLE TO SIZE OR SHAPE VARIABLES.

THE NEW METALSORTER WITH TRIBOSORTER AND THERMOSORTER ATTACHMENTS FOR NON-DESTRUCTIVE — ELECTRICAL SORTING OF CAST METALS, CARBON AND LOW ALLOY STEELS, FERRITIC STAINLESS STEELS, AUSTENITIC STAINLESS STEELS, COPPER, ALUMINUM OR LEAD BASE ALLOYS, HIGH NICKEL-IRON OR NICKEL-CHROMIUM ALLOYS, MAGNETIC OR SINTERED MATERIALS IN ANY SIZE OR FORM.

DOSCHEK ASSOCIATES
25 STATION ST., CRAFTON, PITTSBURGH 5, PA.

PLEASE SEND ME LATEST DESCRIPTIVE BULLETIN ON METALSORTERS

Name
Title
Company
City..... Zone..... State.....

Technical Briefs

Sandblasting:

Castings up to 45 tons are blast cleaned from air conditioned cab

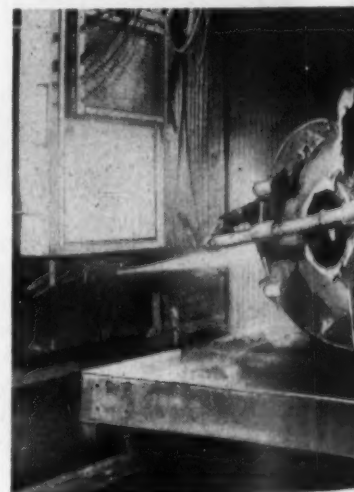
Castings weighing up to 45 tons are being sandblasted more efficiently while the operator works in a traveling, air-conditioned cab at the Falk Corp. in Milwaukee.

The cab moves to any spot on three walls of the blast room and the operator directs an abrasive stream against the casting.

Ability of the abrasive-stream to reach any casting surface, the elimination of cumbersome work clothes, and increased capacity of the mechanically held hose, enable the operator to do more than three times as much work as previously. Castings are cleaned more thoroughly.

The new Hydro-Blast room replaces a conventional hydraulic sand-blast system. Under the old method, the operator dressed from head to foot in rubber clothing and, in order to breathe, pulled along an air hose attached to the helmet of his cleaning suit.

Capacity of blasting-hoses was limited by the operator's strength. Frequent rest periods were necessary.



TRAVELING BLAST operated from air conditioned cab travels on rail around three sides of big castings for cleaning, decorating.

The new set-up, installed by Pangborn, includes a control car, cleaning room, and abrasives recirculation unit. The car, mounted on



anything
is easy

...with

**STAR
BLADES**

Do your metal-cutting jobs the *easy*, efficient, fast way by telling your supplier you want STAR Blades. He'll recommend just the right one in the line for your particular work.

After all, the complete STAR line of hacksaw blades, frames and metal-cutting band saws is the line most people buy.

Sold only through
recognized distributors

CLEMONSON BROS., Inc.
MIDDLETOWN, N.Y., U.S.A.

Makers of Hand and Power Hack Saw Blades,
Frames, Metal Cutting Band Saw Blades
and Clemson Lawn Machines.



1081A

Technical Briefs

a carrier, moves along three sides of the room on a monorail.

The car also moves vertically to give the cleaning-gun complete coverage of the work. The gun-nozzle has a capacity of 60 gal per minute at 2000 lb per sq in. pressure.

The gun may be rotated 60° horizontally and 50° vertically. The operator can direct the abrasive stream to cover all the surfaces and crevices of intricate castings.

The cleaning room is 23 ft 6 in. long, 21 ft wide and 17 ft high. Castings are pushed into the room on a car. Spent sand and water fall to the floor and drain off through a bargate to a reclamation unit.

Build Gap-Frame Welding Press

A gap-frame welding press for use with welding fixtures in mass production of spot welded automotive assemblies has been developed by E. W. Bliss Co.

The gap-style frame permits conveyorized feeding from side to side, which facilitates easy access to the work by operators. Work is accessible from either front or back of the press.

The slide is located in the lower portion of the press and the work stroke is upward. Parts to be welded are laid on the lower "die," which contains welding tips, and moved up into contact with the fixed welding tips attached to the upper part of the press.

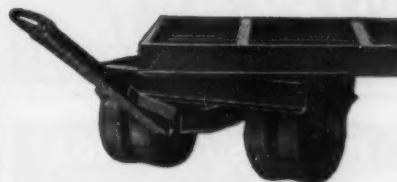
The slide dwells in the upper position, holding the parts in contact with the electrodes until welding is completed.

Pneumatic friction clutch, fly-wheel and motor are located at the top of the press for cleanliness and accessibility. The driveshaft is connected by a long eccentric rod to the slide actuating mechanism in the lower part of the press. This mechanism is enclosed.

Work stroke is adjustable and shut height is the same for all adjustments. Operating cycle is divided into thirds—120° for up-stroke, 120° dwell, 120° down-stroke.



**Trucks
and
Trailers**



**up to 50 ton
capacity**

Built with 80 years of skill by pioneers in the industry. Over a hundred standard two, four, and fifth wheel trucks and trailers. Special units designed and built to your specification. Complete engineering service.

WRITE FOR CATALOG

Name _____

Firm _____

Street _____

City & State _____

THE KILBOURNE & JACOBS MFG. CO.

794 Congress St., Columbus 16, O.

**FREE! INDUSTRIAL
TUBE
BOOKLET!**



**JUST
OFF
THE
PRESS!**

**Purchasing
Agents!
Engineers!**

**MILO
has Everything!**

Write today for this highly informative booklet. Complete technical specifications of all leading brands and types of tubes for all electronic applications—silicon diodes, germanium crystal diodes, thyristors, pions, kenotrons, phantoms, photo tubes, xmitting tubes, etc. Lavishly illustrated. Address Dept. AG.

**Also COMPLETE STOCKS of ALL TYPES
RADIO-ELECTRONIC EQUIPMENT**

**MILO RADIO
& ELECTRONICS CORP.**

200 GREENWICH STREET, NEW YORK 7, N. Y.
Phone BEckman 3-2980 • Teletype NY1-1839

POROUS CASTINGS

save

Nonferrous castings that are porous and are to be used for liquids can be economically sealed against leaks with N Silicate. Aluminum or magnesium castings are immersed about 4 hours in N Silicate diluted to 30° Be., heated to 150–200°F. Castings are then washed in hot water and dried at 215–300°F. Properly applied N Silicate impregnation avoids loss of serviceable castings.

For more information on the uses of silicates of soda in your plant, call PQ.

PHILADELPHIA QUARTZ CO.
1156 Public Ledger Bldg., Phila. 6, Pa.



1831
120th Anniversary
1951

**SILICATES
OF SODA**

Technical Briefs

Jet Trainer:

**Pilots can "bag" enemy plane
without leaving ground . . .**

Future F-86D Sabre jet pilots will "shoot down" their first enemy planes without actually seeing the enemy or leaving the ground. It's done by electronics in the latest device for precombat training of pilots.

An earth-bound trainer was designed and built by Engineering & Research Corp. under contract from North American Aviation, Inc. North American turns out the F-86D Sabre jet fighter. The new unit simulates Sabre jet flight.

The simulator is the first fighter all-weather unit delivered to the Air Force. It is also the first time a simulator has been put into training use concurrently with the beginning of quantity production of a new plane.

The 35,000 lb collection of metal, wiring, electronic tubes, radar scopes and servomechanisms, simulates two planes—one being flown and an approaching enemy plane.

New jet fighters learn how to handle the plane without taking it off the ground, and how to bag an enemy plane as it approaches him at the speed of sound.

The new electro-mechanical trainer contains 1152 electronic tubes, 60 miles of wiring, takes up 600 feet of floor space and stands 10 feet high. It has more than 100,000 parts.

Heart of the trainer, and separate from the cockpit, is a battery of analogue computers. Out of them come the answers to how the pilot "flew the plane."

If the pilot makes a mistake, the computers automatically change the cockpit instrument readings to conform to the actual conditions. Unless the pilot corrects a mistake, the condition will automatically carry through to its logical end, which may well be a fatal crash.

Instructors can put the trainee-pilot through every imaginable set of emergency circumstances. Use of the simulator will aid in speeding up jet fighter-pilot training.

Need
HEAVY
industrial
GEARS
in a
hurry?

Call
SIMONDS
First!

A call to SIMONDS gives you the benefit of more than 60 years of specialization . . . assures fast, accurate reproduction of the most exacting specifications . . . and SIMONDS' central location cuts delivery time to a minimum. For all types of heavy industrial gears, up to 145" dia. and including cast or forged steel, gray iron, bronze, Meehanite, rawhide and bakelite—SIMONDS' production is geared to serve you promptly.

Stock carrying distributors for Ramsey Silent Chain Drives and Couplings, industrial V-Belts.



**SIMONDS
GEARS**

**THE
SIMONDS
GEAR & MFG. CO.**
LIBERTY at 25TH PITTSBURGH 22, PA.

RITCO DROP-FORGINGS

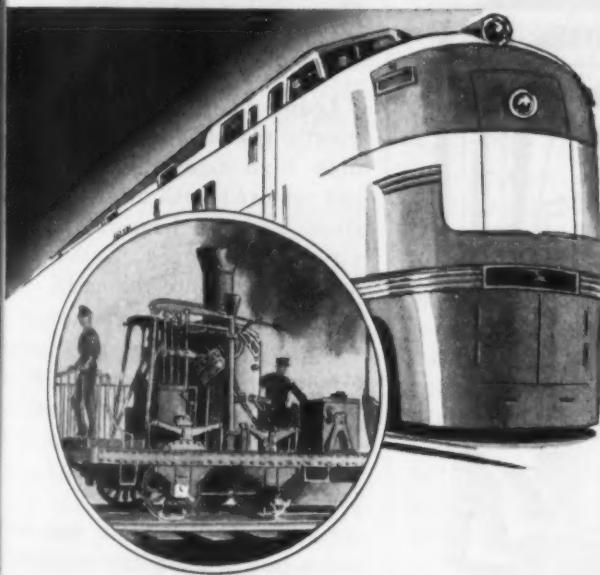
... where HIGH STRENGTH is essential ...

RITCO Bright Finish Forgings are a wise choice. RITCO Forgings are smooth, dimensionally accurate, and free of flash — they're supplied in steel and non-ferrous metals in weights from ¼ lb. to 15 lbs. Also available: Special Bolts, Studs, and Nuts — Grinding — Roll Threading — Heat Treating.

Send blueprints and specifications for free estimates. RHODE ISLAND TOOL COMPANY, 148 West River Street, Providence 1, R. I.

Exclusive New England Representative for Cleveland Cap Screws.

SERVING AMERICAN INDUSTRY SINCE 1834



PROGRESS of a Century

If you should check a list of companies operating in the United States in 1855 — the year of our founding — you would find that very few indeed have been able to survive the economic upheavals of nearly a century. Survival is conditioned upon maintaining high quality standards at all times.

SUPERSTRONG boxes and crates have always enjoyed a reputation for dependability because of their sturdy construction . . . SUPERSTRONG container design has been quick to adapt to changing shipping conditions . . . SUPERSTRONG service is undergoing constant expansion in order to handle customer requirements more quickly and efficiently.

You can't go wrong with SUPERSTRONG.



RATHBORNE, HAIR AND RIDGWAY BOX CO.
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

Measurement:

NBS device monitors temperature change at 48 points . . .

A temperature monitoring device, recently developed by researchers of the National Bureau of Standards, warns of temperature change at any one of 48 points.

Although developed to monitor temperature-critical points in shipboard applications, it could be used in other installations.

From the centrally located NBS monitor unit, pairs of wires run to individual thermocouples mounted at the critical points. A master alarm light goes on if any of the 48 points become too hot, and an alarm bell will ring simultaneously if desired.

The location of the trouble is shown promptly by a separate indicating unit. On the panel of this unit are 48 lights arranged in rows, each corresponding to a thermocouple.

These lights flash to show which thermocouples (up to five) are over-temperature. The actual temperature at any single point can be measured, if desired, by plugging a meter into the circuit.

The monitor covers the range from 100° to 400°F, and each circuit can be individually set to trigger the alarm at any temperature within this range. Nominal accuracy is within 4 degrees at 100°F and within 10 degrees at 400°F.

A crucial part of the temperature monitor is its scanning switch. This mechanical assembly rotates uniformly with a 5-second period. On each revolution one section of the switch samples each of the 48 thermocouples in turn.

The thermocouple signal, after application of a voltage that automatically corrects for variations in the cold-junction temperature, passes through a pulse-forming circuit and is amplified.

Amplified pulses are fed to an alarm relay circuit, consisting of a thyratron whose grid-to-cathode bias is arranged to be proportional to the desired alarm temperature.

Whenever the pulse amplitude exceeds the bias on the thyratron, the tube fires, closing a self-latching relay that turns on the master alarm light, and, optionally, rings the alarm bell.

Stress Analysis:

Photoelastic 3-dimensional method freezes interior stresses . . .

A new method of 3-dimensional photoelastic stress analysis has been developed by Dr. Max M. Frocht of Illinois Institute of Technology, and Roscoe Guernsey of the University of Texas.

With the new method it is now possible to determine the actual principal stresses at any interior point of a body. Prior to this development, only principal shears could be found.

In making such a study a plastic model of the part to be analyzed is machined. This is placed in a special furnace.

Loads are applied while the plastic model is heated to a suitable high temperature and are not removed until after the model cools to room temperature. The stresses developed by the loads are "frozen" into the model.

The model can then be sectioned without disturbing the frozen stresses. These sections, when placed in a photoelastic polariscope, reveal a stress pattern which can be photographed.

Stresses present at any one point in a section can be studied in detail and the complete stress system, consisting of maximum, minimum and intermediate stresses, can be found.

The method, which applies to plastic and elastic stresses, makes possible study of 3-dimensional stresses in machine parts and structural elements which had hitherto defied analysis.

*When PRODUCTION
hangs by a "Thread"...*

specify the wire rope that gives the greatest service. "HERCULES" (Red-Strand) Preformed spools more evenly — bends more smoothly. Handles more safely. Splices more easily. Far fewer replacements are needed.

Engineered to reduce internal tension and twisting, "HERCULES" (Red-Strand) Preformed stays on the job — in the groove.

For uninterrupted production, there is only one right rope... be sure to select the correct size and type.



**LESCHEN
WIRE ROPE**

Feel free to consult our Engineering Department at any time for specific recommendations. A. LESCHEN & SONS ROPE CO., 5909 Kennerly Ave., St. Louis, Missouri. Warehouses and branch offices in all principal cities.

Alloy, Stainless Steel Market Showing Dislocations

Some CMP tickets haven't been cashed . . . Consumers wanting steel don't have tickets . . . No rollback expected on regular warehouse prices . . . U. S. may subsidize conversion steel.

This week the alloy and stainless steel market picture is so confused it will require drastic action promptly to bring it back into focus. Even so, it will probably take at least several weeks to get Controlled Materials Plan tickets and steel industry melt schedules straightened out, so that all possible production of these products is channeled to those needing them most urgently.

At the rate Washington is cutting back alloy steel allocations to some industries there is likely to be open space on mill order books for this product during the first half of 1952. This has already happened with stainless steels because military users failed to take all that was set aside for them. Apparently, some high priority orders were placed far in advance of actual need.

No Tickets—Other important consumers who would like to buy this steel can't do so because they don't have the necessary CMP tickets. Right now, roller bearing manufacturers aren't getting tickets for all the steel they need—and which mills could supply.

Manufacturers of heavy cranes, such as are used in steel mills, have been cut back, too. Failure to permit a few hundred tons of steel for this use now will mean—if not corrected at once—that thousands of tons of steel production will be lost because of lack of cranes to handle it.

Off Heats—A serious problem troubling alloy producers is what to do with "off heats." Off heats are not necessarily poor quality steel. The term is merely applied

to mean that that particular furnace batch doesn't meet the metallurgical specifications for which it was intended. Ordinarily the mill would dispose of such steel merely by calling customers who are known to use that type and asking them if they could use a few more tons. This can happen now only in the rare case where the customer happens to have unused CMP tickets.

Stainless, Too—The stainless steel outlook is even more distorted. Some stainless sales people are out searching for straight chrome stainless orders. They need them to keep their furnaces going. It is estimated that chrome-nickel grades take up about 80 pct of the stainless melt for flat-rolled products. Reduced nickel allotments and dislocated tickets (not being cashed) may result in lower melt schedules, unless Washington rushes emergency changes.

The stainless bar outlook is not so bad, since chrome-nickel grades make up a smaller percentage of melts, compared with straight chrome. Also, it appears easier for users to convert to straight chrome grades in bars than in flat-rolled products. A number of chrome-nickel users are testing straight chrome to see if it will work, but they haven't yet placed any substantial orders for it.

Little Change—Price ceilings for the steel middleman, announced late last week, do not mean that regular warehouse customers will get cheaper steel. Prices of steel items sold through established warehouses aren't expected to change much when the

new ceilings become effective Dec. 16 or later.

This is because warehouses, in most cases, will be permitted their regular percentage markups—plus cost increases resulting from the two latest freight rises which they have been absorbing. Price shaving is expected to be just about averaged out by allowing the higher freight costs.

Illegal—The price order will curb the activities of a few steel middlemen and curbstone brokers who have been forging "daisy chains" across the country to conceal their fantastic prices. Until now, their activity, no matter how unethical, was not illegal. Consumer resistance to high prices during the past several weeks had already slowed the gray market to a walk. It is hoped this order will prove to be the legal crusher that will halt it completely.

Subsidy?—Don't be surprised if the government soon starts subsidizing conversion steel. In its simplest form, conversion is the practice of buying semifinished steel from a mill having excess ingot capacity and shipping it to a mill having excess finishing capacity to be processed into the desired form. Manufacturers whose production has been ordered cut back have been shying away from this expensive steel.

Now the government may keep conversion rolling by subsidizing the difference between conversion prices and regular mill prices. Some in Washington regard this as a fair move, since government restrictions have caused the conversion market to wither. So far government urging to use high priced conversion steel has encountered unwillingness from its own agencies, as well as civilian consumers.



VITAL STRUCTURE in Barium's chain of steel service to industry

Making structural shapes is a vital activity in a chain of companies that form a single complete source of steel supply.

The companies are Barium subsidiaries. The maker of structural shapes is Barium's Phoenix Iron & Steel Company, also producing angles, beams, channels, and, through their subsidiary,

Phoenix Bridge Company, constructing and engineering bridges, buildings, and other fabrications from structural steel and plate.

Phoenix is one of fifteen strategically located Barium subsidiaries controlling quality from blast furnace to end product, ready to work closely together (as a

self-contained unit, if need be) to solve your steel problems.

Call on Barium without obligation for unbiased advice, whatever your steel need . . . plate, structurals, fabrications, forgings, stampings, springs, bolts, nuts. Contact Barium at 25 Broad Street, New York City.

BAYONNE BOLT CORP. • CENTRAL IRON AND STEEL CO.
CHESTER BLAST FURNACE • CLYDE IRON WORKS, INC.
CUYAHOGA SPRING CO. • ERIE BOLT AND NUT CO.
GEOMETRIC STAMPING CO. • GLOBE FORGE, INC.
INDUSTRIAL FORGE AND STEEL, INC. • JACOBS AIRCRAFT
ENGINE CORPORATION • KERMATH MFG. CO. • KERMATH
LIMITED (CANADA) • PHOENIX BRIDGE CO. • PHOENIX IRON
AND STEEL CO. • WILEY MANUFACTURING CO.



Market Briefs

high speed—A continuous casting and rolling unit with twice the output of high purity or alloy aluminum of its prototype, introduced only a year ago, is being installed in the Davenport, Iowa, plant of Nichols Wire & Aluminum Company. Developed by Ilario Properzi, head of S.P.A. Continuum, Milan, Italy, the continuous casting and rolling machine yields a ton of aluminum rod an hr.

Fairless Works—Despite some reports to the contrary, the Fairless Works of U. S. Steel Co. will not be melting steel until second quarter of 1952. Iron production will begin about the same time. The company will start breaking in some finishing facilities in the latter part of the first quarter using hot coils from the Irvin Works.

first hull—Chrysler Corp. has delivered its first completed 60-ft hull for the Grumman Albatross from the Plymouth Div. plant at Evansville, Ind. First delivery was made 5 months after Chrysler started work on its defense assignment. About 800 workers are now employed on the project and this will be increased to 1400 when full schedules are reached.

split contract—A million-dollar prime contract for equipping a fertilizer plant at Reykjavik, Iceland, has been split between four American firms, according to the Economic Cooperation Administration. Firms and amounts are: Worthington Pump & Machinery Corp., New York, two contracts totaling \$113,647.55; Electric Heating Equipment Corp., Philadelphia, \$628,825; Cooper Bessemer, New York, \$121,008; and Spaco Co., New York, \$111,608.15.

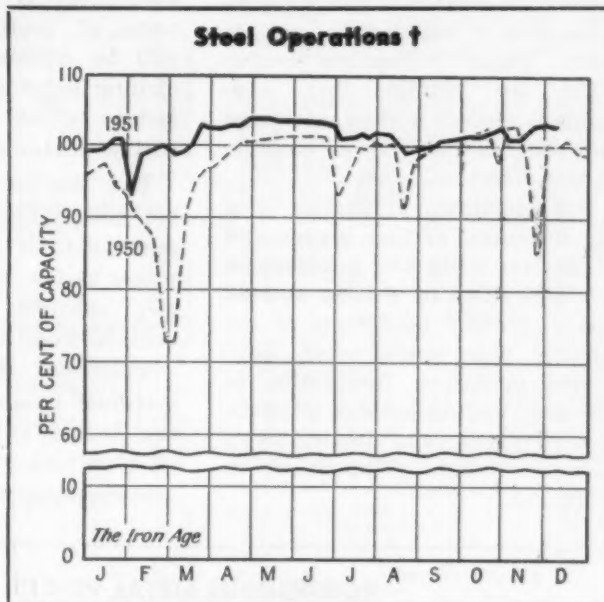
tin plate—Between March 7 and Nov. 1, Weirton Steel Co. shipped more than 200,000 base boxes of electrolytic dual coated tin plate. Most of this was used for commercial packs of tomato juice and other tomato products. The dual coating process makes possible coatings of different weights on the same sheet of tin plate.

pipeline—The new \$135 million natural gas pipeline connecting Texas Gulf Coast fields with the Chicago area has been placed in operation by Texas-Illinois Gas Pipeline Co. This is the third long distance pipeline connecting Chicago with the Southwest. Initial capacity will be 374,000 cu ft daily.

dredging contract—The Orinoco Mining Co., subsidiary of U. S. Steel Corp., last week awarded contracts to the Gahagan Overseas Construction Co. and the McWilliams Overseas Dredging Corp. for the dredging of a 170-mile ship channel in Venezuela. (THE IRON AGE, Sept. 27, 1951, p. 37). Channel will be dredged in the Orinoco and Macareo Rivers from the Gulf of Paria to the company's ore docks at Puerto Ordaz, where a rail terminal will be built.

finish plant—Bureau of Mines has started negotiations with several industrial firms to complete the government-owned alumina plant at Laramie, Wyo. Plant, the last experimental facility authorized in World War II, was never finished. An appropriation of \$350,000 was provided for the work during the current fiscal year. Officials of the Bureau plan to ask for another \$1,000,000 in the new budget to finish construction and provide operating capital.

absorb business—The Babcock & Wilcox Tube Co., subsidiary of The Babcock & Wilcox Co., will be dissolved as of Dec. 31. Business and assets will be absorbed by the parent company. Announcement stressed that the move will have no effect on plant operation so far as customers and employees are concerned.



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Nov. 25	101.0	106.5	104.0	101.5	101.0*	104.0	101.5*	106.0	103.0	104.0	98.5	93.5	138.0	104.0
Dec. 2	101.0	105.5	103.0	101.5	103.0	104.0	103.5	106.0	104.0	104.0	98.5	93.5	114.0	103.5

† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.

* Revised.

Nonferrous Markets

Anaconda Aluminum Picture Fading

Interior joins Justice opposing copper firm's plan to get into aluminum industry . . . Anaconda needs long power commitment . . . Copper people see shortage end—By R. L. Hatschek.

The future of the Anaconda Copper Mining Co.-Harvey Machine Co. aluminum team seems to be clouding over. Dept. of Interior has joined the other side, led by Justice Dept., and its star player, Secretary Oscar Chapman, is going to bat against the new venture. Defense Mobilizer Charles Wilson is pitching for all the aluminum he can get but Mr. Chapman may be too much for him.

Holds Power—Interior literally holds the power over the project—and it doesn't care to allocate any of it for Anaconda on the same grounds that the trust busters disapprove. National Production Authority could order the power but Anaconda needs assurance that it will not be cut off later. These arguments center about the premise that Anaconda is already a huge enterprise and shouldn't be allowed to grow in this direction.

But aluminum production is a big business, getting bigger and it requires a big firm to overcome the difficulties of getting started under present conditions of extremely high cost for an integrated operation. Integration is the only way to build a competitive producer—and Justice Dept. said it wanted competition in aluminum.

MONTHLY AVERAGE PRICES

The average prices of the major non-ferrous metals in November based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley .	24.50
Lake Copper, delivered	24.625
Straits tin, New York	\$1.03
Zinc, East St. Louis	19.50
Zinc, New York	20.29
Lead, St. Louis	18.80
Lead, New York	19.00

Not Small Business—If these agencies succeed in enticing small new firms into the aluminum field there will probably have to be government aid up to the hilt. All sorts of preferential treatment will be necessary—probably including subsidies on the finished metal—before more competition will be achieved.

The "big three" have the sensible notion that the best way to improve their business is to get prices as low as possible. Government subsidies cannot go on forever, so what then happens to the competition? Being actually submarginal it cannot continue. And the U. S. is going to need plenty of aluminum even after the current emergency.

Copper Disagrees—Government men foresee the copper shortage extending at least until 1955 and have been urging a switch from the red metal to substitutes. Copper producers do not hold with this view. The industry recently told National Production Authority that copper will probably be in a better supply-demand position than aluminum within the next 2 or 3 years.

Copper people predict a surplus of supply over demand in about 2 years and point out limited manpower or inadequate facilities as the more likely restricting factors.

Close Copper Deal—American Smelting & Refining Co. is expanding its Pima County, Ariz., copper mines to the tune of \$17 million. Defense Minerals Procurement Agency is guaranteeing a market for 88,500 tons of the first 98,500 tons produced if the company cannot sell it at 24.5¢ per lb. This clause expires in 5½ years. Anticipated yearly production is scheduled to total 18,130 tons.

Magnesium for Aluminum—NPA has suggested that industry switch from aluminum to magnesium for reels and spools. Heavy gage magnesium is in good supply and reactivated plants are turning out ever increasing quantities while aluminum is still short. This points out a future source of competition for aluminum and while aluminum is making inroads on other metal markets, magnesium may well do the same to aluminum.

Tin Sliding—While the outlook for resuming purchases of foreign tin have shown no new developments, prices in the main world markets have been sliding more or less steadily throughout the month of November. Prices early last week were at the c.i.f. New York equivalent of \$1.147½ per lb in Singapore. This is approaching the \$1.12 which Reconstruction Finance Corp. thinks is fair.

NONFERROUS METAL PRICES

	Nov. 28	Nov. 29	Nov. 30	Dec. 1	Dec. 3	Dec. 4
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered . . .	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	....	\$1.03	\$1.03*
Zinc, East St. Louis	19.50	19.50	19.50	19.50	19.50	19.50
Lead, St. Louis	18.80	18.80	18.80	18.80	18.80	18.80

*Tentative

Note: Quotations are going prices.

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 20,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 62S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 62S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 62S, 39.3¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.
Plate 1/4 in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 62S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.
Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 36, 39.5¢ to 116¢; 36 to 38, 47.2¢ to 170¢.
Rod, Rolled: 1 1/2 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.
Screw Machine Stock: Rounds, 11S-T3, 1/4 to 1 1/2 in., 53.5¢ to 42¢; 1/2 to 1 1/2 in., 41.5¢ to 39¢; 1 9/16 to 3 in., 33.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.
Drawn Wire: Coiled, 0.061 to 0.374 in., 2S, 35.5¢ to 29¢; 62S, 49¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.
Extruded Tubing, Rounds: 63-S-T-5, OD in in. 1 1/4 to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.
Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., 51.4¢; 96 in., 51.5¢; 120 in., 51.9¢; 144 in., 52.23¢. Gage 0.24 x 28 in., 72 in., 51.37¢; 96 in., 51.83¢; 120 in., 52.29¢; 144 in., 52.75¢. Coiled Sheet: 0.019 in x 28 in., 23.2¢ per lb; 0.024 in x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FSI-O, 1/4 in., 62¢; 3/16 in., 64¢; 1/2 in., 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 75¢; 16, 85¢; 18, 95¢; 20, 110¢; 22, 127¢; 24, 147¢. Specification grade higher. Base: 30,000 lb.
Extruded Round Rod: M, diam in., 1/4 to 0.111 in., 74¢; 1/2 to 3/4 in., 67.5¢; 1 1/4 to 1.749 in., 83¢; 2 1/4 to 5 in., 48.5¢. Other alloys higher. Base up to 1/2 in. diam, 10,000 lb; 1/2 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.
Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 58.8¢; 4 to 6 lb, 23 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.50 lb, 20,000 lb; 1.50 and heavier, 30,000 lb.
Extruded Round Tubing: M, wall thickness, outside diam. in., 0.04 to 0.057, 1/4 in. to 5/16, 51.4¢; 5/16 to 3/8, 51.5¢; 3/8 to 1/2, 53¢; 1 to 2 in., 76¢; 0.165 to 0.219, 3/8 to 1/2, 61¢; 1 to 2 in., 87¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1 1/4 in., 10,000 lb; 1 1/4 to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, 115; Plate, HR, 112; Wire, rolled and/or drawn, 110; Bar, HR or forged, 110; Forgings, 85.

Nickel and Monel

(Base prices, f.o.b. mill)

"A" Nickel Monel
Sheets, cold-rolled 77 60 1/2
Strip, cold-rolled 83 63 1/2
Rods and bars 73 58 1/2
Angles, hot-rolled 73 58 1/2
Plates 75 59 1/2
Seamless tubes 106 93 1/2
Shot and blocks 53 1/2

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	41.68		41.28
Copper, h-r		37.53	
Copper, drawn		38.78	
Low brass	39.67	39.36	
Yellow brass	38.28	37.97	
Red brass	40.14	39.83	
Naval brass	43.20	37.26	38.53
Leaded copper		41.58	
Com'l bronze	41.13	40.82	
Mang. bronze	46.92	40.51	42.37
Phos. bronze	61.07	61.32	
Muntz metal	41.18	36.74	37.99
Ni silver, 10 pct	49.83	52.04	

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed 19.00
Aluminum pig 18.00
Antimony, American, Laredo, Tex. 50.00
Beryllium copper, 3.75-4.25% Be. 15.56
Beryllium aluminum 5% be, Dollars per lb contained Be \$69.00
Bismuth, ton lots \$2.25
Cadmium, del'd \$2.55
Cobalt, 97-99% (per lb) \$2.40 to \$2.47
Copper, electro, Conn. Valley 24.50
Copper, Lake, delivered 24.625
Gold, U. S. Treas., dollars per oz. \$35.00
Indium, 99.8%, dollars per troy oz. \$2.25
Iridium, dollars per troy oz. \$200
Lead, St. Louis 18.80
Lead, New York 19.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb. 24.50
Magnesium, sticks, 100 to 500 lb 42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York \$215-\$218
Nickel electro, f.o.b. N. Y. warehouse 59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel 52.75
Palladium, dollars per troy oz. \$24.00
Platinum, dollars per troy oz. \$90 to \$93
Silver, New York, cents per oz. 88.00
Tin, New York 11.03
Titanium, sponge \$5.00
Zinc, East St. Louis 19.50
Zinc, New York 20.20
Zirconium copper, 50 pct \$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5 ingot
No. 115 27.25
No. 120 26.75
No. 123 26.25
80-10-10 ingot
No. 305 32.25
No. 315 30.25
88-10-2 ingot
No. 210 40.00
No. 215 38.50
No. 245 33.50
Yellow ingot
No. 405 23.25
Manganese bronze
No. 421 30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper, max. 20.6
0.60 copper, max. 20.4
Piston alloys (No. 122 type) 21.2
No. 12 alum. (No. 2 grade) 19.5
108 alloy 20.6
195 alloy 20.8
13 alloy 20.8
ASX-679 20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1-95-97 1/2% 18.00
Grade 2-92-95% 17.75
Grade 3-90-92% 17.25
Grade 4-85-90% 16.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper
Cast, oval, 15 in. or longer 37.84
Electrodeposited 33.34
Flat rolled 33.34
Forged ball anodes 43
Brass, 80-20
Cast, oval, 15 in. or longer 34.4
Zinc, oval 26.4
Ball anodes 25.2
Nickel 99 pct plus
Cast 76.80
Rolled, depolarized 77.00
Cadmium \$2.80
Silver 999 fine, rolled, 180 oz lots, per troy oz, f.o.b. Bridgeport, Conn. 97 1/2

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum 63
Copper sulfate, 99.5 crystals, bbl. 12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed 20.4
Nickel chloride, 375 lb drum 27.2
Silver cyanide, 100 oz lots, per oz. 67.4
Sodium cyanide, 95 pct domestic 200 lb drums 19.25
Zinc cyanide, 100 lb drum 47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1/4¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turn-ings
Copper	21 1/4	20 1/2
Yellow brass	19 1/4	17 1/2
Red brass	20 1/4	19 1/4
Comm. bronze	20 1/4	19 1/4
Mang. bronze	18 1/4	17 1/4
Brass rod ends	18 1/4	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	16.50
Brass pipe	16.50
Radiators	14.75

Aluminum

Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18 1/4-19 1/4
No. 2 heavy copper and wire	17 1/4-17 1/2
Light copper	16-16 1/2
New type shell cuttings	16-16 1/2
Auto radiators (unswaged)	14 1/4-14 1/2
No. 1 composition	18-18 1/2
No. 1 composition turnings	17 1/2-18
Unlined red car boxes	16 1/2-17 1/2
Cocks and faucets	15 1/2-16
Mixed heavy yellow brass	12-12 1/2
Old rolled brass	15-15 1/2
Brass pipe	14-14 1/2
New soft brass clippings	16-16 1/2
Brass rod ends	15 1/2-16
No. 1 brass rod turnings	15-15 1/2

Aluminum

Alum. pistons and struts	6 1/4-7 1/2
Aluminum crankcases	7 1/2-8
2S aluminum clippings	10 1/2
Old sheet and utensils	7 1/2-8
Borings and turnings	5-6
Misc. cast aluminum	7 1/2-8
Dural clips (24S)	10-11

Zinc

New zinc clippings	13 1/4-13 1/2
Old zinc	10-10 1/2
Zinc routings	6 1/2-7
Old die cast scrap	6 1/2-7

Nickel and Monel

Pure nickel clippings	35-36
Clean nickel turnings	35-36
Nickel anodes	35-36
Nickel rod ends	35-36
New Monel clippings	28-29
Clean Monel turnings	20-21
Old sheet Monel	23-29
Nickel silver clippings, mixed	13-14
Nickel silver turnings, mixed	12-13

Lead

Soft scrap, lead	15 1/4-16
Battery plates (dry)	10 1/2-11
Batteries, acid free	7-7 1/4

Magnesium

Segregated solids	15-16
Castings	14-15

Miscellaneous

Block tin	85-90
No. 1 pewter	60-65
No. 1 auto babbitt	48-50
Mixed common babbitt	16 1/4-16 1/2
Solder joints	21-22
Siphon tops	48-50
Small foundry type	21-22
Monotype	18 1/4-19
Lino. and stereotype	17 1/2-18
Electrotype	16-16 1/2
Hand picked type shells	10-11
Lino. and stereo. dross	8 1/4-9
Electro. dross	7 1/4-8

High Ingot Rate Marches into Trouble

Steel operating rate unshaken . . . But trouble brews in background . . . Pittsburgh shortage still critical . . . ISIS' Barringer says shipments of purchased scrap down in November.

Steel producers are marching deeper into the scrap iron and steel shortage with openhearthers going full blast. The industry's ingot operating rate was unshaken despite scrap scarcity—but in the background trouble was developing.

The scrap flow was slowing in some districts, cutbacks in civilian production were squeezing the flow of vital prompt industrial scrap, the network of NPA allocations was spreading out, and imminent cold weather could shrink supplies further and snarl up rail transportation.

The scrap situation in Pittsburgh remained desperate. U. S. Steel Co. mills in Chicago were pinched for supplies. The largest mills because of their huge demands for metallics were worse off inventorywise. Mills in other areas were in the danger zone but somehow managing to hold their own.

Edwin C. Barringer, executive vice-president of the Institute of Scrap Iron & Steel, speaking in San Antonio urged the scrap industry to intensify its collection efforts. He admitted that receipts of purchased scrap in November had shown a marked decline.

He indicated that the scrap trade's spectacular collection record this year "might be marred" if a few openhearthers shut down for lack of scrap. He said it was unfortunate that this might be so since steel mills have been operating at top capacity all year long.

Purchased scrap shipments to consumers in the first 9 months of 1951 was 25,163,000 gross tons and consumers only withdrew 472,000 tons from their stockpiles.

Office of Price Stabilization is sounding controls enforcement thunder and warned the trade

that solicitation, offering, and selling scrap at over ceiling prices is illegal. It took one Pennsylvania firm to court last Tuesday and hinted darkly that other prosecutions will come later.

Pittsburgh—U. S. Steel Corp. plants here are still holding on, but continue dangerously close to the brink of scrap-caused production curtailment. Ohio River Steel Corp., at Toronto, Ohio, is in much the same boat, but was helped out early last week by a couple of carloads from a larger mill. Scrap people are as pessimistic as they have ever been about the outlook for Pittsburgh.

Chicago—U. S. Steel Co. mills are still the hardest pressed here. Late last week their scrap inventories averaged 5 days. South was down to 2 and 3 days while those at Gary were 6 to 8 days. Scrap is being diverted from Gary to South. Although notice of allocations has been received, the company claims no shipments have been received as yet. Other mills are holding up fairly well with inventories running 3 weeks to a month. Mild weather last week should loosen up rural shipments.

Philadelphia—Activity in the cast market is showing a bit more life despite relatively low operations by the foundries. There is very little free steel scrap in this market—the vast majority is allocated and only the small operators handling small tonnages are active in a free market. Very little material is now going out of the district. Still another mill has decided to accept truck shipments.

New York—Two serious deterrents to the scrap flow are restrictions on use, working against openhearth users, and cost limits on dealer-to-dealer activity, some in the trade here believe. Quick correction of these control gimmicks could be stimulus to collections now when it's needed. Scrap is moving more slowly and the supply is tight. Allocations grow.

Detroit—While far from good, the scrap picture in Detroit is less critical than it is in some other steel producing areas. The comment heard most frequently is "We're holding our own." While a siege of cold weather could bring an abrupt change in the situation and the sharp drop in production scrap scares some, Detroit can hardly be classified at the moment as a critical scrap area.

Cleveland—Slack production at gray iron foundries for past 4 months keeping most cast grades free but stainless steel scrap is tight. Mills rolling nickel alloys are groping. Milder weather has increased deliveries to some mills but not by much. Improvement is temporary but just in time. NPA salvage men may soon strike out among high schools in agricultural areas to get cooperation among school boys in locating scrap.

St. Louis—Last week saw no easing of tight scrap iron supplies: Steel mills are using scrap faster than it is being received, and inventories generally are down to an average of less than 3 weeks. Country scrap is very short, and little is coming from industrial plants because of cutbacks of civilian goods. Railroad lists are improved but still low.

Birmingham — Scrap brokers report some mills in the South are scraping the yards for scrap. Despite allocations, some are hardly getting enough heavy melting to keep operating. Dealers are advertising and begging for scrap, but it is just not coming in.

Cincinnati—Industrial scrap in this area continues to fall off. As more plants obtain defense material contracts anxiety grows among scrap buyers. Feeling is that when these plants get tooled and into production their scrap will be of alloyed materials unsuited to local mill use. Presently mills are operating on about 5 to 8 day inventories.

Boston — Previously slow-moving unclean motor blocks joined the parade of activity as brokers and dealers here reported that every section of the list is in heavy demand.

Buffalo — Mills here are working with a 2 to 3 weeks inventory. There is talk of new allocations out of the district. Fresh local supplies are at low ebb.

125 YEARS OF SERVING INDUSTRY, GOVERNMENT AND THE PUBLIC

SPECIALTY PRODUCTS



STAINLESS CLAD STEEL

PERMACLAD Stainless Clad

Steel combines the surface characteristics of solid stainless with the easy forming qualities of mild carbon steel—provides corrosion resistance at lower cost.

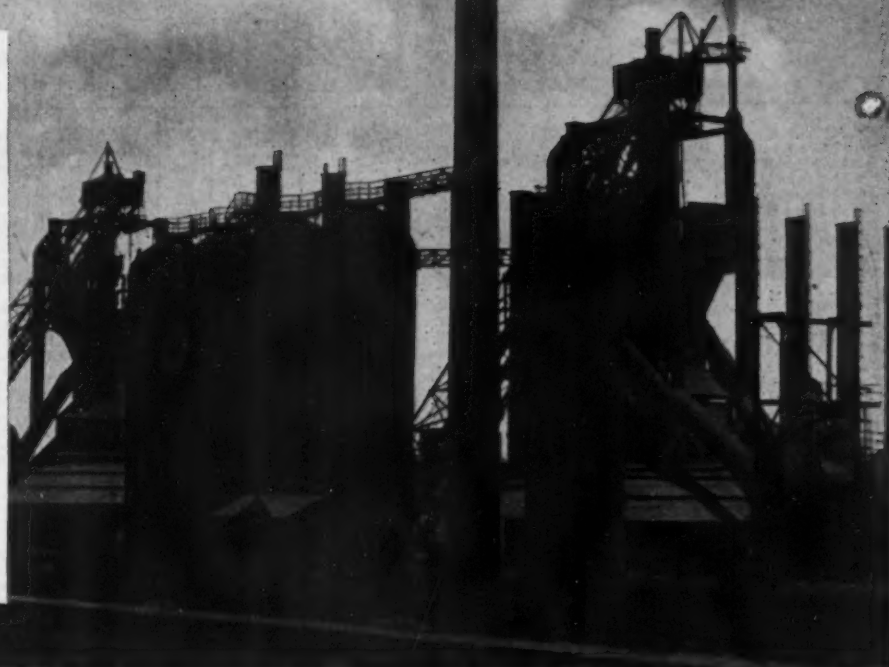
ABRASIVE ROLLED STEEL FLOOR PLATE

A. W. ALGRIP Abrasive
Rolled Steel Floor Plate is made by rolling tough abrasive grain as an integral part of the upper portion of steel plate. Result: Positive protection against slipping, even on steep inclines.



ROLLED STEEL FLOOR PLATE

A. W. SUPER-DIAMOND Rolled
Steel Floor Plate, made with an all-over, engineered pattern of raised, skid-resistant diamonds, is easy to clean, easy to match, and grips without a slip.



ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

We proudly mark our 125th year of iron and steel making experience and pledge ourselves to work diligently to help keep America strong. At present we may not be able to supply all of your

requirements for steel but we want you to know that we are doing everything within our power to expand our capacity so we can continue to serve Industry, Government and the Public.

PRODUCTS OF ALAN WOOD STEEL COMPANY

IRON PRODUCTS

"Suede" Pig Iron

Foundry, Malleable, Bessemer and Basic

STEEL PRODUCTS

PLATES (SHEARED)

Tank, Ship, Boiler, Flange and Structural Qualities

Furnished in carbon, copper, or alloy analyses

A. W. Dynalloy (High Strength Plates)

HOT ROLLED SHEETS

Special qualities in carbon, copper, or alloy analyses

A. W. Dynalloy (High Strength Sheets)

HOT ROLLED STRIP

Coiled and cut lengths

Carbon, copper, or alloy analyses

A. W. ROLLED STEEL FLOOR PLATES

A. W. Algrip Abrasive

A. W. Super-Diamond Pattern

STAINLESS-CLAD STEEL

Permaclad Sheets and Plates

Standard and special qualities available in desired finishes

A. W. CUT NAILS

Reading Brand

Black, Quenched and Tempered, Galvanized

MINE PRODUCTS

Iron Ore Concentrates,

Sintered Concentrates, Crushed Stone, Grit, Sand and Engine Sand

COKE

Foundry, Industrial and Domestic

COAL CHEMICALS

Coke Oven Gas • Crude Coal Tar • Ammonium Sulphate • Industrial Benzol, Toluol, Xylol • Motor Benzol • Crude Solvent Naphtha • Crude Naphthalene • Crude Tar Bases • Sodium Phenolate • Crude Light Oil Still Residue

ALAN WOOD STEEL COMPANY

Conshohocken, Pa.



IVY ROCK, PA. • SWEDELAND, PA. • DOVER, N. J. • OXFORD, N. J.

December 6, 1951

231

Scrap Prices

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, set by OPS in CPR 5 and amendments. Shipping point and delivered prices calculated as shown below.)

GRADES	OPS No.	Basing Points															
		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monaca	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Midvale
No. 1 bundles	1	\$44.00	\$44.00	\$44.00	\$43.00	\$42.50	\$42.00	\$41.50	\$41.00	\$40.50	\$40.00	\$39.50	\$39.00	\$38.50	\$38.00	\$37.50	\$37.00
No. 1 busheling	2	44.00	44.00	44.00	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00
No. 1 heavy melting	3	43.00	43.00	43.00	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00
No. 2 heavy melting	4	43.00	43.00	43.00	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00
No. 2 bundles	5	43.00	43.00	43.00	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00
Machine shop turnings	6	34.00	34.00	34.00	33.00	32.50	32.00	31.50	31.00	30.50	30.00	29.50	29.00	28.50	28.00	27.50	27.00
Mixed borings and turnings	7	38.00	38.00	38.00	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00
Shoveling turnings	8	38.00	38.00	38.00	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00
Cast iron borings	10	38.00	38.00	38.00	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00	32.50	32.00	31.50	31.00
No. 1 chemical borings	26	41.00	41.00	41.00	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00	35.50	35.00	34.50	34.00
Forge crops	11	51.50	51.50	51.50	50.50	50.00	49.50	49.00	48.50	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50
Bar crops and plate	12	49.00	49.00	49.00	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00
Punchings and plate	14	46.50	46.50	46.50	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50
Electric furnace bundles	15	46.00	46.00	46.00	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00
Cut struct., plate, 3 ft and less	16	47.00	47.00	47.00	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00
Cut struct., plate, 2 ft and less	17	49.00	49.00	49.00	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00
Cut struct., plate, 1 ft and less	18	50.00	50.00	50.00	49.00	48.50	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00
Foundry steel, 2 ft and less	20	44.00	44.00	44.00	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00
Foundry steel, 1 ft and less	21	46.00	46.00	46.00	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00
Heavy trimmings	24	43.00	43.00	43.00	42.00	41.50	41.00	40.50	40.00	39.50	39.00	38.50	38.00	37.50	37.00	36.50	36.00
Hard steel, 2 ft and less	30	49.00	49.00	49.00	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00
No. 1 RR heavy melting	RR 1	46.00	46.00	46.00	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00	40.50	40.00	39.50	39.00
Scrap rails, random lengths	RR 14	48.00	48.00	48.00	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00
Scrap rails, 3 ft and less	RR 16	51.00	51.00	51.00	50.00	49.50	49.00	48.50	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00
Scrap rails, 2 ft and less	RR 17	52.00	52.00	52.00	51.00	50.50	50.00	49.50	49.00	48.50	48.00	47.50	47.00	46.50	46.00	45.50	45.00
Scrap rails, 18 in. and less	RR 18	54.00	54.00	54.00	53.00	52.50	52.00	51.50	51.00	50.50	50.00	49.50	49.00	48.50	48.00	47.50	47.00
Rolling rails	RR 19	53.00	53.00	53.00	52.00	51.50	51.00	50.50	50.00	49.50	49.00	48.50	48.00	47.50	47.00	46.50	46.00
Uncut tires	RR 20	48.00	48.00	48.00	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00	41.50	41.00
Cut tires	RR 21	51.00	51.00	51.00	50.00	49.50	49.00	48.50	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00
Cut bolsters and side frames	RR 23	49.00	49.00	49.00	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00	43.50	43.00	42.50	42.00
RR specialties	RR 24, 25, 29	51.00	51.00	51.00	50.00	49.50	49.00	48.50	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00
Solid steel axles	RR 25	58.00	58.00	58.00	57.00	56.50	56.00	55.50	55.00	54.50	54.00	53.50	53.00	52.50	52.00	51.50	51.00
No. 3 steel wheels	RR 27	51.00	51.00	51.00	50.00	49.50	49.00	48.50	48.00	47.50	47.00	46.50	46.00	45.50	45.00	44.50	44.00
Unassorted	RR 35	40.00	40.00	40.00	39.00	38.50	38.00	37.50	37.00	36.50	36.00	35.50	35.00	34.50	34.00	33.50	33.00

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	\$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron car wheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runouts or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh: Bessemer, Homestead, Duquesne, Munhall, Cincinnati: Newport, St. Louis: Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco: South San Francisco, Niles, Oakland, Claymont: Chester, Chicago: Gary.

SHIPPING POINT PRICES (Except RR scrap)—for shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is \$1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, \$1.50, and New England ports, \$1.75. Maximum shipping point price on No. 1 bundles (prime grade) in New York City is \$36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap)—Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point non-operating RR's, and RR scrap sold by

someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C and amend. 4, CPR 5.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Under Amend. 5 to CPR 5 ceiling prices are established for certain unprepared grades. Unprepared steel scrap for compression into No. 1 bundles calls for a \$6 differential (or deduction) from the base (No. 1 bundles). Unprepared steel scrap for No. 2 bundles, \$9 from base. Unprepared steel scrap other than material suitable for hydraulic compression, \$3 from base. Sec. 7 (a) (2) (Railroad grades) is amended to include: Unprepared steel scrap other than material suitable for hydraulic compression, \$3 from base.

COMMISSIONS—Brokers are permitted a maximum of \$1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel: \$1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. Molybdenum: \$2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, \$3 for content over 0.65 pct. Manganese: \$4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., \$14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. Silicon: electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. Chromium: \$1 may be added if scrap conforms to SAE 62100 analysis.

Multiple Alloys: If scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rolling rails, cupola cast, billet, bloom, and forge crops.

Nos. 1 and 2 chemical borings. Ceiling price on billet, bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer.

See Amend. 5 to CPR for setting of single price on No. 1 Heavy, No. 2, and No. 1 bundles. No. 1 bundles are made prime grade from which to add or subtract differential, from which to add or subtract dealer sale under ceilings, permitting a \$1 resale margin, and trucking charges may be added only on shipments of prepared scrap.

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	\$8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	8.00
Bar crops and plate, cast steel, plate, ingots and plate, cut structural and plate, 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	\$35.00
No. 1 bundles	34.00
No. 2 bundles	32.00
Mechanical bundles	31.00
Mixed, steel scrap	30.00
Rails, remelting	30.00
Rails, rerolling	30.00
Bushellings	30.00
Bushellings, prepared new factory	30.00
Bushellings, unprepared new factory	28.00
Short steel turnings	28.00
Mixed borings, turnings	28.00
Cast scrap	25.00

SCRAP

for your every requirement

LURIA BROTHERS AND COMPANY, INC.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

PLANTS MAIN OFFICE

OFFICES

LEBANON, PENNA.

LINCOLN-LIBERTY BLDG.

BIRMINGHAM, ALA.

CHICAGO, ILLINOIS

HOUSTON, TEXAS

PITTSBURGH, PA.

READING, PENNA.

Philadelphia 7, Penna.

Empire Building

100 W. Monroe St.

1114 Texas Av. Bldg.

Oliver Building

DETROIT (ECORSE),

MICHIGAN

BOSTON, MASS.

CLEVELAND, OHIO

LEBANON, PENNA.

PUEBLO, COLORADO

MODENA, PENNA.

Statler Building

1022 Midland Bldg.

Luria Building

334 Colorado Bldg.

PITTSBURGH, PENNA.

Genesee Building

2011 Book Building

100 Park Avenue

READING, PENNA.

Luria Building

ERIE, PENNA.

ST. LOUIS, MISSOURI

2052 Hallway Exchange Bldg.

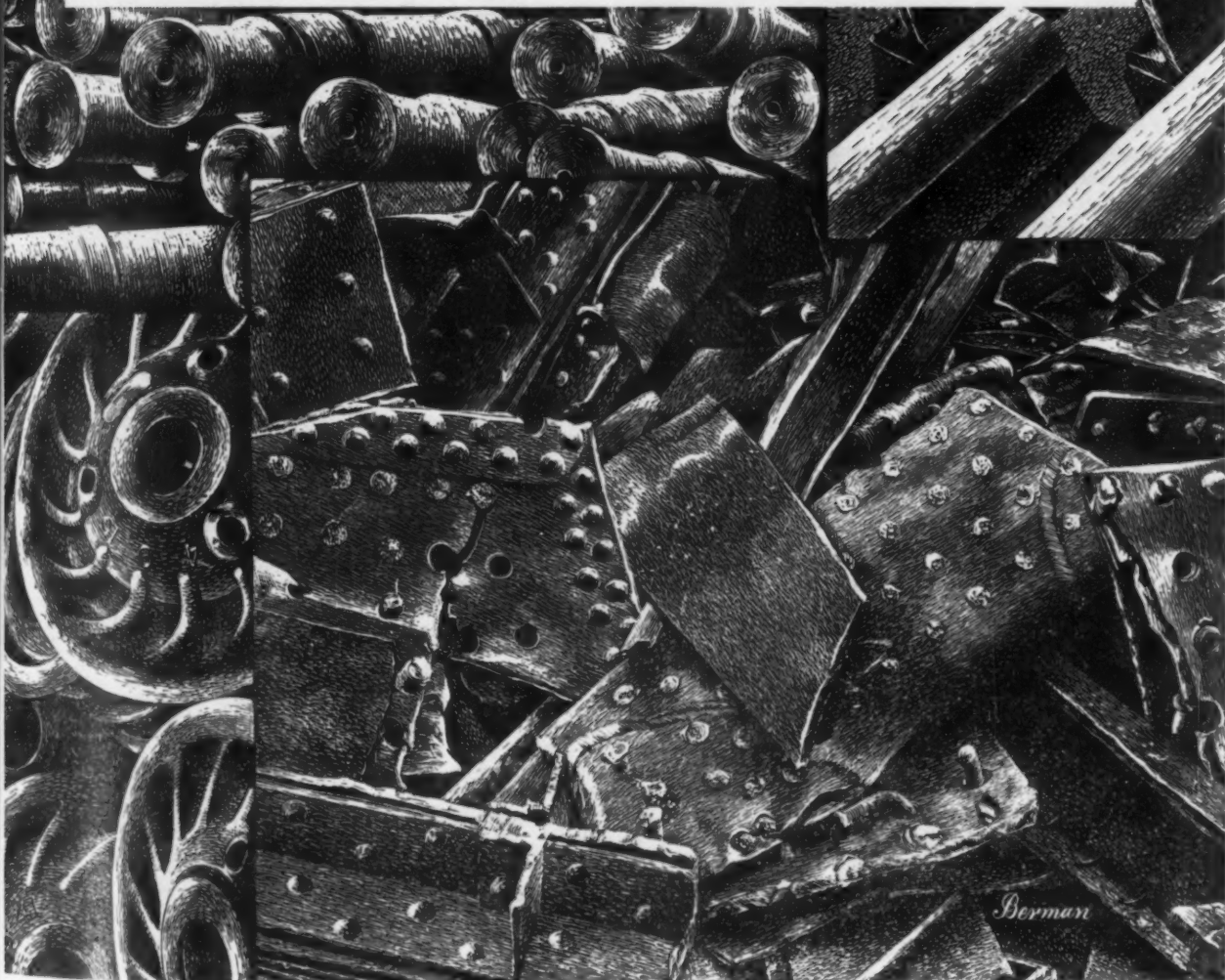
SAN FRANCISCO, CALIFORNIA

Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1899



Berman



Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Dec. 4	Nov. 27,	Nov. 6,	Dec. 5
(cents per pound)	1951	1951	1951	1950
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	36.50

Tin and Ternplate:

(dollars per base box)				
Tinplate (1.50 lb.) cokes.	\$8.70	\$8.70	\$8.70	\$7.50
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	6.60
Special coated mfg. ternes	7.50	7.50	7.50	6.35

Bars and Shapes:

(cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.25
Wrought iron bars	9.50	9.50	9.50	9.50

Wire

(cents per pound)				
Bright wire	4.85	4.85	4.85	4.85

Rails:

(dollars per 100 lb)				
Heavy rails	\$3.60	\$3.60	\$3.60	\$3.60
Light rails	4.00	4.00	4.00	4.00

Semifinished Steel:

(dollars per net ton)				
Rerolling billets	\$56.00	\$56.00	\$56.00	\$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	70.00	70.00

Wire Rod and Skelp:

(cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron:	Dec. 4	Nov. 27,	Nov. 6,	Dec. 5
(per gross ton)	1951	1951	1951	1950
No. 2 foundry, del'd Phila.	\$57.97	\$57.97	\$57.97	\$56.27
No. 2, Valley furnace....	52.50	52.50	52.50	51.00
No. 2, Southern Cin'ti...	55.58	55.58	55.58	55.58
No. 2, Birmingham.....	48.88	48.88	48.88	48.88
No. 2, foundry, Chicago†	52.50	52.50	52.50	52.50
Basic del'd Philadelphia.	57.09	57.09	57.09	55.42
Basic, Valley furnace....	52.00	52.00	52.00	50.50
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese†	186.25	186.25	186.25	181.20

†The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

†Average of U. S. prices quoted on Ferroalloy page.

Scrap:

(per gross ton)				
No. 1 steel, Pittsburgh...	\$43.00*	\$43.00*	\$43.00*	\$43.75
No. 1 steel, Phila. area..	41.50*	41.50*	41.50*	38.75
No. 1 steel, Chicago.....	41.50*	41.50*	41.50*	39.75
No. 1 bundles, Detroit...	41.15*	41.15*	41.15*	41.25
Low phos. Young'n.....	46.50*	46.50*	46.50*	46.25
No. 1 cast, Pittsburgh..	49.00†	49.00†	49.00†	62.75
No. 1 cast, Philadelphia..	49.00†	49.00†	49.00†	56.50
No. 1 cast, Chicago.....	49.00†	49.00†	49.00†	63.00

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville:

(per net ton at oven)				
Furnace coke, prompt...	\$14.75	\$14.75	\$14.75	\$14.25
Foundry coke, prompt...	17.75	17.75	17.75	18.75

Nonferrous Metals:

(cents per pound to large buyers)				
Copper, electro, Conn....	24.50	24.50	24.50	24.50
Copper, Lake, Conn.....	24.625	24.625	24.625	24.625
Tin, Straits, New York.	\$1.03†	\$1.03	\$1.03	\$1.395
Zinc, East St. Louis....	19.50	19.50	19.50	17.50
Lead, St. Louis.....	18.80	18.80	18.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	51.22
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex...	50.00	50.00	42.00	32.00

†Tentative.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1949 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

Composite Prices

Finished Steel Base Price

Dec. 4, 1951.....	4.131¢	per lb.....
One week ago.....	4.131¢	per lb.....
One month ago.....	4.131¢	per lb.....
One year ago	4.131¢	per lb.....

	High	Low
1951....	4.131¢ Jan. 2	4.131¢ Jan. 2
1950....	4.131¢ Dec. 1	3.837¢ Jan. 3
1949....	3.837¢ Dec. 27	3.3705¢ May 3
1948....	3.721¢ July 27	3.193¢ Jan. 1
1947....	3.193¢ July 29	2.848¢ Jan. 1
1946....	2.848¢ Dec. 31	2.464¢ Jan. 1
1945....	2.464¢ May 29	2.396¢ Jan. 1
1944....	2.396¢	2.396¢
1943....	2.396¢	2.396¢
1942....	2.396¢	2.396¢
1941....	2.396¢	2.396¢
1940....	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939....	2.35367¢ Jan. 3	2.26689¢ May 16
1938....	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937....	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936....	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1932....	1.89196¢ July 5	1.83910¢ Mar. 1
1929....	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Pig Iron

.....	\$52.72	per gross ton....
....	52.72	per gross ton....
....	52.72	per gross ton....
....	51.94	per gross ton....

	High	Low
\$52.72 Oct. 9	\$52.69 Jan. 2	
52.69 Dec. 12	45.88 Jan. 3	
46.87 Jan. 18	45.88 Sept. 6	
46.91 Oct. 12	39.58 Jan. 6	
37.98 Dec. 30	30.14 Jan. 7	
30.14 Dec. 10	25.37 Jan. 1	
25.37 Oct. 23	23.61 Jan. 2	
\$23.61	\$23.61	
23.61	23.61	
23.61	23.61	
\$23.61 Mar. 20	\$23.45 Jan. 2	
23.45 Dec. 23	22.61 Jan. 2	
22.61 Sept. 19	20.61 Sept. 12	
23.25 June 21	19.61 July 6	
32.25 Mar. 9	20.25 Feb. 16	
19.74 Nov. 24	18.73 Aug. 11	
14.81 Jan. 5	13.56 Dec. 6	
18.71 May 14	18.21 Dec. 17	

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

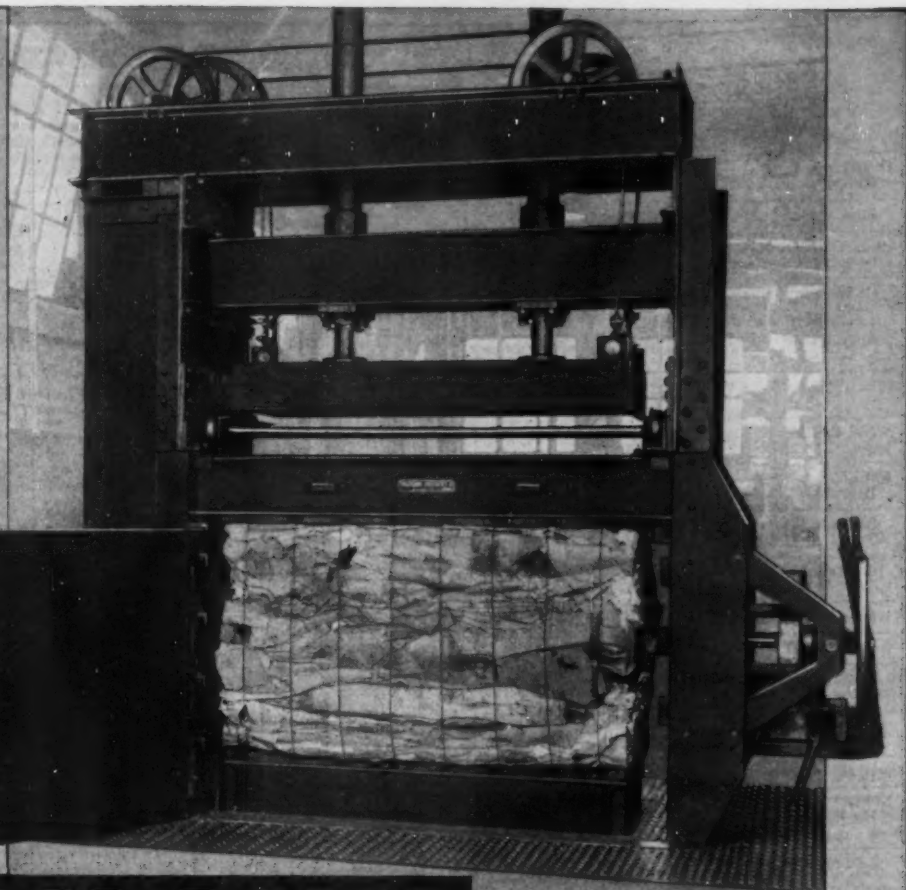
Scrap Steel

.....	\$42.00	per gross ton.....
.....	42.00	per gross ton.....
.....	42.00	per gross ton.....
.....	40.75	per gross ton.....

	High	Low
\$47.75 Jan. 30	\$42.00 Oct. 23	
45.13 Dec. 19	26.25 Jan. 3	
43.00 Jan. 4	19.33 June 23	
43.16 July 27	39.75 Mar. 9	
42.58 Oct. 28	29.50 May 20	
31.17 Dec. 24	19.17 Jan. 1	
19.17 Jan. 2	18.92 May 23	
19.17 Jan. 11	15.76 Oct. 24	
\$19.17	\$19.17	
19.17	19.17	
\$22.00 Jan. 7	\$19.17 Apr. 19	
21.83 Dec. 30	16.04 Apr. 9	
22.50 Oct. 3	14.08 May 16	
15.00 Nov. 22	11.00 June 7	
21.92 Mar. 30	12.67 June 9	
17.75 Dec. 21	12.67 June 8	
8.50 Jan. 12	6.43 July 5	
17.58 Jan. 29	14.08 Dec. 8	

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

This Logemann Hydraulic Paper Baler produces from 1,000 to 1,500 pound bales of miscellaneous paper and carton accumulations in a large industrial plant.



LOGEMANN

WASTE PAPER BALERS

LOGEMANN

also specializes in
METAL BALING PRESSES

that give you compact
high density bales
and

HIGH PRESSURE PUMPS

... for pressures from 2,000
to 50,000 p.s.i. for press operation,
hydraulic tests and similar applications.

Powerful... Compact... Hydraulically Operated for High Speed Baling

Miscellaneous paper and carton balers are obtainable in all sizes from small motor driven units to high speed, extremely powerful, deep box hydraulic balers.

In addition to the baling of paper salvage accumulations, Logemann Presses have been used profitably in the baling of paper and cardboard from manufacturing processes, rags, fiber, rubber, and even light gauge metals. Many unusual baling applications have proven to be highly successful. Experienced Logemann engineers are available for the discussion of any special baling problems. For information on any specific application . . .

Write for Complete Details

LOGEMANN BROTHERS CO.

3164 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

IRON AGE	Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page. Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.													
STEEL PRICES	Pittsburgh	Chicago	Gary	Cleveland	Canton Mass- illon	Middle- town	Youngs- town	Bethle- hem	Buffalo	Conshe- hocken	Johns- town	Spar- rows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	\$52.00 ¹													
Alloy, net ton	\$54.00 ¹⁻¹⁷													\$54.00 ¹
BILLETS, BLOOMS, SLABS Carbon, re-rolling, net ton	\$56.00 ¹⁻⁵	\$56.00 ¹	\$56.00 ¹						\$56.00 ³		\$56.00 ³			
Carbon forging billets, net ton	\$68.00 ¹⁻⁵	\$66.00 ¹⁻⁴	\$66.00 ¹	\$66.00 ⁴	\$66.00 ⁴				\$66.00 ³⁻⁴	\$73.00 ²⁻⁶	\$66.00 ³			\$68.00 ¹⁻⁴
Alloy, net ton	\$70.00 ¹⁻¹⁷⁻⁶	\$70.00 ¹⁻⁴	\$70.00 ¹⁻⁶		\$70.00 ⁴			\$70.00 ³	\$70.00 ³⁻⁴	\$77.00 ²⁻⁶	\$70.00 ³			\$73.00 ¹⁻⁴
PIPE SKELP	3.35 ¹ 3.45 ⁵						3.35 ¹⁻⁴							
WIRE RODS	4.10 ² 4.30 ¹⁻⁸	4.10 ²⁻⁴⁻³⁻³	4.10 ⁶	4.10 ²			4.10 ⁶		4.10 ³⁻⁵		4.10 ³	4.20 ³		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60 ¹⁻⁵⁻⁹⁻¹³⁻¹⁵ 3.75 ²⁻⁸	3.60 ²⁻⁸	3.60 ¹⁻⁶⁻⁹	3.60 ⁴⁻⁵		3.60 ⁷	3.60 ¹⁻⁴⁻⁶ 4.00 ¹⁻³		3.60 ³	4.00 ²⁻⁶		3.60 ³	4.30 ²⁻³	3.80 ¹⁻² 4.40 ¹⁻⁷
Cold-rolled	4.35 ¹⁻⁵⁻⁹⁻¹³⁻¹⁵⁻⁷		4.35 ¹⁻⁶⁻⁸	4.35 ⁴⁻⁵		4.35 ⁷	4.35 ¹⁻⁶		4.35 ³			4.35 ³	5.05 ²⁻³	4.55 ¹⁻²
Galvanized (10 gage)	4.80 ¹⁻⁹⁻¹³		4.80 ¹⁻⁸		4.80 ⁴	4.80 ⁷	5.50 ⁴⁻⁴ 6.00 ²⁻⁴					4.80 ³	5.50 ²⁻³	
Enameling (12 gage)	4.65 ¹		4.65 ¹⁻⁸	4.65 ⁴		4.65 ⁷	4.65 ⁵						5.35 ²⁻³	
Long terme (10 gage)	5.20 ¹⁻¹⁵		5.20 ¹			5.20 ⁷	6.00 ²⁻⁴							
Hi str. low alloy, h.r.	5.40 ¹⁻⁵ 5.75 ⁹	5.40 ¹	5.40 ¹⁻⁸ 5.90 ⁶	5.40 ¹⁻⁵			5.40 ¹⁻⁴⁻¹³ 5.90 ⁶		5.40 ³	5.65 ²⁻⁶		5.40 ³		5.95 ¹⁻²
Hi str. low alloy, c.r.	6.55 ¹⁻⁵ 6.90 ⁹		6.55 ¹⁻⁸ 7.05 ⁶	6.55 ⁴⁻⁵			6.55 ⁴ 7.05 ⁶		6.55 ³			6.55 ³		7.10 ¹⁻²
Hi str. low alloy, galv.	7.20 ¹											6.75 ³		
STRIP Hot-rolled	3.60 ⁹ 4.00 ⁴⁻¹¹⁻¹⁵ 3.75 ²⁻⁸ 3.50 ³⁻⁷	3.50 ⁶	3.50 ¹⁻⁶⁻⁸			3.50 ⁷	3.50 ¹⁻⁴⁻⁶ 4.00 ¹⁻³		3.50 ³⁻⁴	3.90 ²⁻⁶	3.50 ³	3.50 ³		4.40 ¹⁻⁷ 3.80 ¹⁻²
Cold-rolled	4.65 ²⁻⁷⁻⁹ 5.00 ²⁻⁸ 5.35 ⁴⁻⁶⁻¹³	4.90 ⁸⁻⁶⁻⁶	4.90 ⁸	4.65 ²⁻⁵		4.65 ⁷	4.65 ⁴⁻⁶ 5.25 ⁴⁻⁶⁻¹⁰ 5.35 ¹⁻³⁻⁴⁻⁶		4.65 ³			4.65 ³		4.85 ¹⁻² 5.45 ⁷ 5.80 ⁹⁻⁴⁻⁶
Hi str. low alloy, h.r.	5.75 ⁹		5.50 ¹ 5.30 ⁵⁻⁵⁻⁸⁰				4.95 ⁴ 5.50 ¹ 5.40 ¹⁻³ 5.80 ⁶ 6.20 ⁴ 6.55 ¹⁻³ 7.05 ⁶		4.95 ³	5.55 ²⁻⁶		4.95 ²		5.95 ¹⁻²
Hi str. low alloy, c.r.	7.20 ⁹			6.55 ² 6.70 ⁵					6.40 ³			6.40 ³		
TINPLATE ¹ Cokes, 1.25 lb base box (1.50 lb, add 25¢)	\$8.45 ¹⁻⁵⁻⁹⁻¹³		\$8.45 ¹⁻⁶⁻⁸				\$8.45 ⁴					\$8.55 ³		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb base box, \$7.15 ¹⁻⁴⁻⁵⁻⁸⁻⁹⁻⁹ ; \$7.25 ³⁻¹¹ ; \$7.35 ²⁻² 0.50 lb, add 25¢; 0.75 lb add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85 ¹ 6.15 ¹⁻⁵		5.85 ¹				5.30 ⁴							
BARS Carbon steel	3.70 ¹⁻⁵ 3.85 ⁹	3.70 ¹⁻⁴⁻²³	3.70 ¹⁻⁴⁻⁶⁻⁸	3.70 ⁴	3.70 ⁴		3.70 ¹⁻⁴⁻⁶		3.70 ³⁻⁴		3.70 ³			3.85 ¹⁻¹ 4.80 ¹⁻⁹
Reinforcing	3.70 ¹⁻⁵	3.70 ⁴	3.70 ¹⁻⁶⁻⁸	3.70 ⁴			3.70 ¹⁻⁴⁻⁶		3.70 ³⁻⁶		3.70 ³	3.70 ³		
Cold-finished	4.55 ²⁻⁴⁻⁵⁻¹³⁻¹⁵⁻¹⁷ 5.2-6-9-7-1	4.55 ²⁻²³⁻⁷⁰	4.55 ⁴⁻⁷⁻⁴⁻⁷⁻³	4.55 ²	4.55 ⁴⁻⁸⁻²		4.55 ⁶⁻⁵⁻⁷		4.60 ⁷⁻⁹					4.70 ⁴⁻¹
Alloy, hot-rolled	4.30 ¹⁻¹⁷	4.30 ¹⁻⁴⁻²³	4.30 ¹⁻⁶⁻⁸		4.30 ⁴		4.30 ¹⁻⁶	4.30 ⁸	4.30 ⁶⁻⁴		4.30 ³			4.45 ¹⁻¹ 4.65 ¹⁻²
Alloy, cold-drawn	5.40 ¹⁻⁷⁻⁵²⁻⁵⁹⁻⁷¹⁻²	5.40 ⁴⁻²³⁻⁶⁹⁻⁷⁰⁻⁷³ 5.45 ²	5.40 ⁴⁻⁷⁻³⁻⁷⁻⁴		5.40 ⁴⁻³²		5.40 ⁶⁻²⁵⁻⁵⁷	5.40 ³	5.40 ³					5.55 ⁴⁻¹ 5.60 ¹⁻¹⁰
Hi str. low alloy, h.r.	5.55 ¹⁻⁵		5.55 ¹⁻³ 6.05 ⁶	5.55 ⁴⁻⁵			5.55 ¹ 6.05 ⁶	5.55 ³	5.55 ²		5.55 ³			
PLATE Carbon steel	3.70 ¹⁻⁵⁻¹³ 4.00 ⁹	3.70 ¹⁻²³	3.70 ¹⁻⁶⁻⁸	3.70 ⁴⁻⁵			3.70 ¹⁻⁴⁻⁶ 3.95 ¹⁻³		3.70 ³	4.15 ²⁻⁶	3.70 ³	3.70 ³	4.40 ²⁻³	
Floor plates	4.75 ¹	4.75 ¹	4.75 ⁵	4.75 ⁵						4.75 ²⁻⁶				
Alloy	4.75 ¹	4.75 ¹	4.75 ¹				5.20 ¹⁻³			5.05 ²⁻⁶	4.75 ³	4.75 ³		
Hi str. low alloy	5.65 ¹⁻⁵	5.65 ¹	5.65 ¹⁻⁸ 6.15 ⁶	5.65 ⁴⁻⁵			5.65 ⁴ 5.70 ¹⁻³ 6.15 ⁶			5.90 ²⁻⁶	5.65 ³	5.65 ³		
SHAPES, Structural	3.65 ¹⁻⁵ 3.90 ⁹	3.65 ¹⁻²³	3.65 ¹⁻⁸					3.70 ³	3.70 ³		3.70 ³			
Hi str. low alloy	5.50 ¹⁻⁵	5.50 ¹	5.50 ¹⁻⁸ 6.00 ⁶				6.00 ⁶	5.50 ³	5.50 ³		5.50 ³			
MANUFACTURERS' WIRE Bright	4.85 ²⁻⁵ 5.10 ¹⁻⁸	4.85 ² 4.3-3-3-4		4.85 ²			4.85 ⁶	Kokomo = 4.95 ³⁻¹⁰ 4.115 ³⁻⁵			4.85 ³	4.95 ³	Duluth = 4.85 ²	
PILING, Steel Sheet	4.45 ¹	4.45 ¹	4.45 ⁸						4.45 ³					

Smaller numbers indicate producing companies. See key at right.
Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana	
			F = \$78.00 ¹⁰	
	\$62.00 ¹²		F = \$80.00 ¹⁰	
		\$56.00 ¹¹	F = \$75.00 ¹⁰	
	\$74.00 ¹²	\$86.00 ¹¹	F = \$85.00 ¹⁰ SF, LS, S = \$85.00 ¹²	Geneva = \$86.00 ¹⁶
	\$78.00 ¹²		F = \$89.00 ¹⁰ LA = \$90.00 ¹²	
				Alton = 4.40 ²² Worcester = 4.40 ²² Minnequa = 4.35 ¹⁴ Portsmouth = 4.30 ²⁰
	4.90 ¹²	4.10 ¹¹	SF = 4.90 ² , F = 4.90 ¹⁰ LA = 4.90 ^{24, 23}	Niles = 5.25 ¹⁴ , Geneva = 3.70 ¹⁶ Ashland = 3.60 ⁷
		3.60 ¹¹	SF, LA = 4.30 ²⁴ F = 4.55 ¹⁰	Ashland = 4.80 ⁷ Kokomo = 5.20 ¹⁰
		4.25 ¹¹	SF = 5.30 ²⁴ F = 5.30 ¹⁰	Ashland = 4.65 ⁷
		4.80 ¹¹	SF, LA = 5.55 ²⁴	
		5.40 ¹¹	F = 6.35 ¹⁰	
			F = 7.50 ¹⁰	
				Alton = 3.95 ²² Atlanta = 4.05 ¹⁶ Minnequa = 4.55 ¹⁴ Ashland = 3.50 ⁷
4.10 ¹²	4.90 ¹²	3.80 ¹¹	SF, LA = 4.25 ^{24, 22} F = 4.75 ¹⁰ , S = 4.50 ¹²	New Haven = 5.15 ² , 5.85 ¹² Trenton = 6.00 ¹⁵
			F = 6.30 ¹⁰ LA = 6.40 ¹⁷	
		5.30 ¹¹	F = 6.20 ¹⁰ SF, LA = 6.05 ²² S = 6.30 ¹²	
			F = 6.95 ¹⁰	
			SF = 9.20 ²⁴	
		\$8.55 ¹¹		
4.30 ¹²	4.10 ¹²	3.70 ¹¹	SF, LA = 4.40 ²⁴	Alton = 4.15 ²² Atlanta = 4.25 ¹⁶ Minnequa = 4.15 ¹⁴
4.30 ¹²	4.10 ¹²	3.70 ¹¹	SF, S = 4.45 ¹⁰ F = 4.40 ¹⁰ , LA = 4.40 ²²	Atlanta = 4.25 ¹⁶ Minnequa = 4.50 ¹⁴
			LA = 6.00 ⁴	Newark = 5.00 ¹⁰ Putnam = 5.10 ¹⁰ Hartford = 5.10 ⁴
4.90 ¹²	4.70 ¹²		LA = 5.35 ¹⁰ F = 5.35 ¹⁰	
		5.55 ¹¹	F = 6.60 ¹⁰ , SF, S = 6.30 ¹² LA = 6.25 ¹²	Newark = 5.75 ¹⁰ Worcester = 5.75 ² Hartford = 5.85 ⁴
		4.10 ¹²	F = 4.30 ¹⁰ S = 4.60 ¹²	Claymont = 4.15 ¹⁰ Coatesville = 4.15 ²¹ Harrisburg = 6.75 ¹⁵ Minnequa = 4.50 ¹⁴ Geneva = 3.70 ¹⁶
			F = 5.70 ¹⁰	Harrisburg = 6.75 ¹⁵
		5.65 ¹¹	F = 6.25 ¹⁰ S = 6.55 ¹²	Coatesville = 5.25 ²¹ Claymont = 4.85 ²⁰
4.20 ¹²	4.00 ¹²	3.60 ¹¹	SF = 4.20 ¹² , F = 4.25 ¹⁰ LA = 4.25 ^{24, 22} , S = 4.30 ¹²	Geneva 3.65 ¹⁶ , Minnequa 4.10 ¹⁴ Phoenixville = 6.25 ¹⁶
		5.90 ¹¹	S = 6.10 ¹² , F = 6.10 ¹⁰ SF = 6.00 ¹² , LA = 6.05 ²²	Geneva = 5.50 ¹⁶
5.45 ¹²	5.25 ¹²	4.85 ¹¹	SF, LA = 5.80 ²⁴	Alton = 5.05 ²² Atlanta = 5.10 ¹⁶ , Worcester = 5.15 Minnequa = 5.10 ¹⁴ Portsmouth = 5.25 ²⁰

Key to Steel Producers

- U. S. Steel Co., Pittsburgh
- American Steel & Wire Co., Cleveland
- Bethlehem Steel Co., Bethlehem
- Republic Steel Corp., Cleveland
- Jones & Laughlin Steel Corp., Pittsburgh
- Youngstown Sheet & Tube Co., Youngstown
- Armco Steel Corp., Middletown, Ohio
- Inland Steel Co., Chicago
- Weirton Steel Co., Weirton, W. Va.
- National Tube Co., Pittsburgh
- Tennessee Coal, Iron & R. R. Co., Birmingham
- Great Lakes Steel Corp., Detroit
- Sharon Steel Corp., Sharon, Pa.
- Colorado Fuel & Iron Corp., Denver
- Wheeling Steel Corp., Wheeling, W. Va.
- Geneva Steel Co., Salt Lake City
- Crucible Steel Co. of America, New York
- Pittsburgh Steel Co., Pittsburgh
- Kaiser Steel Corp., Oakland, Calif.
- Portsmouth Div., Detroit Steel Corp., Detroit
- Lukens Steel Co., Coatesville, Pa.
- Granite City Steel Co., Granite City, Ill.
- Wisconsin Steel Co., South Chicago, Ill.
- Columbia Steel Co., San Francisco
- Copperweld Steel Co., Glassport, Pa.
- Alan Wood Steel Co., Conshohocken, Pa.
- Calstrip Steel Corp., Los Angeles
- Allegheny Ludlum Steel Corp., Pittsburgh
- Claymont Steel Corp., Claymont, Del.
- Continental Steel Corp., Kokomo, Ind.
- Retary Electric Steel Co., Detroit
- Laclede Steel Co., Alton, Ill.
- Northwestern Steel & Wire Co., Sterling, Ill.
- Keystone Steel & Wire Co., Peoria, Ill.
- Central Iron & Steel Co., Harrisburg, Pa.
- Carpenter Steel Co., Reading, Pa.
- Eastern Stainless Steel Corp., Baltimore
- Washington Steel Corp., Washington, Pa.
- Jessop Steel Co., Washington, Pa.
- Blair Strip Steel Co., New Castle, Pa.
- Superior Steel Corp., Carnegie, Pa.
- Timken Steel & Tube Div., Canton, Ohio
- Babcock & Wilcox Tube Co., Beaver Falls, Pa.
- Reeves Steel & Mfg. Co., Dover, Ohio
- John A. Roebling's Sons Co., Trenton, N. J.
- Simonds Saw & Steel Co., Fitchburg, Mass.
- McLouth Steel Corp., Detroit
- Cold Metal Products Co., Youngstown
- Thomas Steel Co., Warren, Ohio
- Wilson Steel & Wire Co., Chicago
- Sweet's Steel Co., Williamsport, Pa.
- Superior Drawn Steel Co., Monaca, Pa.
- Tremont Nail Co., Wareham, Mass.
- Firth Sterling St. & Carbide, McKeesport
- Ingersoll Steel Div., Chicago
- Phoenix Iron & Steel Co., Phoenixville, Pa.
- Fitzsimons Steel Co., Youngstown
- Stanley Works, New Britain, Conn.
- Universal-Cyclops Steel Corp., Bridgeville, Pa.
- American Cladmetals Co., Carnegie, Pa.
- Cuyahoga Steel & Wire Co., Cleveland
- Bethlehem Pacific Coast Steel, San Fran.
- Follansbee Steel Corp., Pittsburgh
- Niles Rolling Mill Co., Niles, Ohio
- Atlantic Steel Co., Atlanta
- Acme Steel Co., Chicago
- Joslyn Mfg. & Supply Co., Chicago
- Detroit Steel Corp., Detroit
- Wycoff Steel Co., Pittsburgh
- Bliss & Laughlin, Inc., Harvey, Ill.
- Columbia Steel & Shaffing Co., Pittsburgh
- Cumberland Steel Co., Cumberland, Md.
- La Salle Steel Co., Chicago
- Monarch Steel Co., Inc., Hammond, Ind.
- Empire Steel Co., Mansfield, Ohio
- Mahoning Valley Steel Co., Niles, Ohio
- Oliver Iron & Steel Co., Pittsburgh
- Pittsburgh Screw & Bolt Co., Pittsburgh
- Standard Forging Corp., Chicago
- Driver Harris Co., Harrison, N. J.
- Detroit Tube & Steel Div., Detroit
- Reliance Div., Eaton Mfg. Co., Massillon, Ohio
- Sheffield Steel Corp., Kansas City
- Plymouth Steel Co., Detroit
- Wickwire Spencer Steel, Buffalo
- Angell Nail and Chaplet, Cleveland
- Mid-States Steel & Wire, Crawfordsville, Ind.
- National Supply, Pittsburgh, Pa.
- Wheatland Tube Co., Wheatland, Pa.
- Mercer Tube & Mfg. Co., Sharon, Pa.
- Woodward Iron Co., Woodward, Ala.
- Gloss-Sheffield Steel & Iron Co., Birmingham
- Hanna Furnace Corp., Detroit
- Interlake Iron Corp., Cleveland
- Lone Star Steel Co., Dallas
- Mystic Iron Works, Everett, Mass.
- Jackson Iron & Steel Co., Jackson, O.
- Globe Iron Co., Jackson, O.
- Pittsburgh Coke & Chemical Co., Pittsburgh
- Shenango Furnace Co., Pittsburgh
- Tennessee Products & Chem. Corp., Nashville
- Koppers Co., Inc., Granite City, Ill.
- Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
- Wallingford Steel Co., Wallingford, Conn.
- Tonawanda Iron Div., N. Tonawanda, N. Y.
- Pilgrim Drawn Steel Div., Automotive Materials Corp., Plymouth, Mich.

† Special coated mfg. terms deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 70-lb. deduct \$2.20 from 1.25-lb coke base box.

Steel Prices

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingot re-rolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slab billets re-rolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	18.75
Forg. disc die block rings	34.00	34.25	38.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars wire structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip hot-rolled	26.50	26.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets*: Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 4¢); 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.
Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 4¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13 (type 301 add 1/4¢); Butler, Pa., 7; Wallingford, Conn., 104.
Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.
Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.
Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.
Plates: Brackenridge, Pa., 28 (type 416 add 1/4¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.
Forged discs, die blocks, rings: Pittsburgh, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.
Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.
***ALLEGHENY LUDLUM**—Slightly higher on Type 301; slightly lower on others in 300 Series.
WASHINGTON STEEL—Slightly lower on 300 Series except where noted.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Base Col.	Base Col.	Base Col.	Base Col.	Base Col.	Base Col.	e/lb.	e/lb.
Alabama City-4	118	126		123		136	5.70	5.95
Alliquippa, Pa.-5	118	132		136		140	5.70	6.15
Atlanta-65	121	133		126	126	143	5.95	6.40
Bartonsville-34	118	130		123	143	143	5.70	6.15
Buffalo-85								4.85
Cleveland-86	125							
Cleveland-2							5.70	6.15
Crawfordsville-87		132				145	5.95	6.40
Donora, Pa.-2	118	130		123	140	140	5.70	6.15
Duluth-2	118	130		123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130		123	140	140	5.70	6.15
Houston-83	126	138				148	6.10	6.55
Johnstown, Pa.-3	118	130				140	5.70	6.15
Joliet, Ill.-2	118	130		123		140	6.70	6.15
Kokomo, Ind.-30	120	132		125	138	142	5.80	6.05
Los Angeles-62							6.65	
Kansas City-83	130			135		152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135				145	5.95	6.40
Moline-III-4			138					
Pittsburg, Cal.-24	137			147		160	6.65	6.80
Portsmouth-20	124	137				147	6.10	6.60
Rankin, Pa.-2	118	130				140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123		138	5.70	5.95
S. San Fran.-14				147		160	6.65	7.10
Sparrows Pt.-3	120			125	142	142	5.80	6.25
Sterling, Ill.-32	118	130		123	140	140	5.70	6.15
Struthers, Ohio-6							6.70	6.15
Torrance, Cal.-24	138						6.65	
Worcester-2	124						6.00	6.45
Williamport, Pa.-51			150					

Cut Nails, carloads, base, \$7.35 per 100 lb (less 20¢ to jobbers), at Conshohocken, Pa., (28), Wheeling, W. Va., (15), \$7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axis	Screw Spikes	Tie Plates	Track Screws
Bessemer-1	3.80	4.00	4.70					
Chicago-4				6.18				
Cleveland-3						9.35		
Enley-11	3.80	4.00						
Fairfield-11		4.00	4.70	6.18	5.60			
Gary-1	3.80	4.00						
Ind. Harbor-8	3.80		4.70	6.18	5.60			
Johnstown-3		4.00			5.00			
Joliet-1		4.00	4.70					
Kansas City-83				6.40				
Lackawanna-3	3.80	4.00	4.70					
Lebanon-3				6.15		9.35		
Minnequa-14	3.80	4.00	4.70	6.15				
Pittsburgh-3								
Pittsburgh-77						9.35		
Pittsburgh-78								
Pittsburgh-8				6.15				
Pittsburgh-24						4.65		
Seattle-82				6.65		4.65		
Steelton-3	3.80		4.70					
Struthers-6				6.15				
Torrance-24				6.15		4.65		
Youngstown-4				6.15				
Cleveland-4						9.35		

BOILER TUBES \$ Per 100 ft. out, 10 to 24 ft

F.o.b. Mill	Size	Seamless	Elec. Weld
	OD-In.	B.W. Ga.	H.R. C.D. H.R. C.D.
Babcock & Wilcox	2	13	22.67 26.66 21.00 25.00
	2 1/2	12	30.48 35.84 29.57 34.71
	3	12	33.00 39.90 32.00 38.71
	3 1/2	11	42.37 49.89 41.10 48.31
	4	10	52.00 61.88 51.00 60.00
National Tube	2	13	21.62 26.43
	2 1/2	12	29.65 36.32
	3	12	34.00 41.84
	3 1/2	11	40.34 49.41
	4	10	51.21 62.72
Pittsburgh Steel	2	13	27.00
	2 1/2	12	30.49 37.15
	3	12	34.95 42.59
	3 1/2	11	41.48 50.54
	4	10	52.65 64.16

FLUORSPAR

Washed gravel, f.o.b. Rosclair, Ill.
 Price, net ton; Effective CaF₂ content:
 70% or more \$43.99
 60% or less 48.88

CAST IRON WATER PIPE

Per Net Ton
 6 to 24-in., del'd Chicago \$105.30 to \$108.80
 6 to 24-in., del'd N.Y. 108.50 to 109.50
 6 to 24-in., Birmingham 91.50 to 96.00
 6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less \$123.00 to \$130.00
 Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about \$250 per net ton.

	BUTTWELD										SEAMLESS									
	1/2 In.	3/4 In.	1 In.	1 1/4 In.	1 1/2 In.	2 In.	2 1/2-3 In.	2 In.	2 1/2-3 In.	3 1/2-4 In.	1/2 In.	3/4 In.	1 In.	1 1/4 In.	1 1/2 In.	2 In.	2 1/2-3 In.	3 1/2-4 In.	3 1/2-4 In.	3 1/2-4 In.
	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.	Blk. Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0						
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0						
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.0	42.5	21.0	43.0	21.5	43.5	22.0	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	16.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Alton, Ill.-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0						
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0						
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5		32.5		34.5	
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0						
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0						
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	35.0	15.0
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.0	17.0
Alton, Ill.-32	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0						
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.5	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0						
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0		33.0		36.0	
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.0	17.0

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: 1/

WAREHOUSES

REFRACTORIES

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5).....	\$34.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	13.75

Mt. Union, Pa., Ensley, Ala.	\$94.66
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.60
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick	<i>Per Net Ton</i>
Standard chemically bonded, Balt.,	
Chester	\$82.00

Standard, Baltimore	\$104.00
Chemically bonded, Baltimore....	93.00

Grain Magnesite	St. $\frac{1}{2}$ -in. grains
Domestic, f.o.b. Baltimore, in bulk fines removed	\$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢....\$13.75

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$14.50 to \$15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$17.50 to \$18.00
Foundry, oven coke	
Buffalo, del'd	\$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	25.00
Shelby, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.75
Swedeland, Pa. f.o.b.	22.68
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

(51.50% c; natural content, delivered lower lake ports)	Per gross ton
Old range, bessemer	\$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.28- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1.05	1.06- 1.35
Bridgeport, Conn.-68	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41		6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-68	5.60	6.65	7.25		
New Castle, Pa.-40	5.35	6.80	7.40	9.35	
New Haven, Conn.-68	5.85	6.75	7.35		
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Wilton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48		6.80	7.40	9.35	11.65

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (16 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled A 4815 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4815 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49 ² 8.07	6.04	.....	5.80	6.14	6.04	6.84 6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00	7.74 8.29	6.15	6.50 ⁴	6.40 6.78	6.20	6.05	6.79 6.84	10.25	10.55	11.90 12.00	12.20 12.30
Buffalo	5.60	6.40	7.74 8.09	5.88	.....	6.05	5.80	5.60	6.40 6.45	10.15 10.85	10.45	11.80	11.95 12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30 9.80	.....	10.10	11.45	11.75
Cincinnati*	5.67	6.44	7.39	.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.55	11.99
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.50	10.11	10.41	11.79	12.09
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, Ind.*	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.65	6.40	9.45 ⁶	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33 6.38	7.06 7.10	.....	6.33 6.38	.....	6.43 6.02	6.33 6.48	6.06 6.33	7.16 7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89 6.59	5.69 6.59	.....	5.94	5.84	5.69	6.44 6.54	9.94	10.24	11.59	11.99
New Orleans*	5.70	6.50	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67 5.97 6.50 ³	7.19 ¹ 7.24 ¹	8.14 ²	6.29 6.89	8.63 ⁴	6.29 6.58 6.50 ³	6.10	6.12	6.99	10.05 10.15	10.35 10.45	11.70 11.80	12.10 12.20
Newark	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65 5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60 7.55	8.95 9.10	8.60 9.70	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	10.50 ²	8.70 8.75	.....	8.05	6.75 8.30	7.95 8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	0.05 ²	8.55 8.90 ²	6.60	9.95 ⁶	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20 13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80 5.85	6.65	8.00	5.80	8.00 ⁴ 8.28	6.13	6.03	5.80	6.55 6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.98	8.31	6.11	.....	6.36	6.26	6.11	6.98	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanizing sheets, for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 200 to 5000 lb.

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50			
Birmingham-4	48.38	48.68					
Birmingham-61	48.38	48.88					
Birmingham-82	48.38	48.88					
Buffalo-4	52.00	52.50	53.00				
Buffalo-83	52.00	52.50	53.00			63.75	
Chicago-94	52.00	52.50	52.50	53.00			
Cleveland-2	52.00	52.80	52.80	53.00	57.00		
Cleveland-4	52.00	52.50	52.80				
Dallasfield, Tex.-95	48.00	48.50	48.80				
Duluth-94	52.00	52.50	52.80	53.00			
Erie-94	52.00	52.50	52.80	53.00			
Everett, Mass.-99		57.00	57.50				
Fontana-19	58.00	58.50					
Geneva, Utah-16	52.00	52.50	52.50	53.00			
Granite City, Ill.-102	53.90	54.40	54.90				
Hubbard, Ohio-6	52.00	52.80	52.50				
Huron, Utah-16	52.00	52.50					
Jackson, Ohio-87, 99						62.50	
Jays, Tenn.-101							66.00
Mohessen-18	54.00						
Neville Island-99	52.00	52.50	52.50	53.00			
Pittsburgh-1	52.00			53.00			
Sharpsville-100	52.00	52.50	52.50	53.00			
Stettin-3	54.00	54.50	55.00	55.50	60.00		
Swadeland-26	56.00	56.50	57.00	57.50			
Waco-34	52.00	52.50	52.50	53.00			
Wey, N. Y.-4	54.00	54.50	55.00		60.00		
Youngstown-6	52.00	52.50	52.50	53.00			
& Tonawanda, N. Y.-105		52.50	53.00				

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct). \$0.30 per ton for each 0.50 pct manganese over 1 pct. \$2 per ton for 0.5 to 0.75 pct nickel. \$1 for each additional 0.25 pct nickel over base. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery iron. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. \$1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer small on prices are \$1 over comparable silvery iron.

Profit from

**FEWER
OPERATIONS
and
COMPLETE
CONTROL OF
MACHINING—**

with **WYCKOFF**
Cold Finished Steel
CARBON and ALLOY

Four
CONVENIENT MILLS
TO SERVE YOU!

WYCKOFF STEEL COMPANY

FIRST NATIONAL BANK BUILDING • PITTSBURGH 30, PA.

3200 S. KEDZIE AVENUE • CHICAGO 23, ILLINOIS

Works at: Ambridge, Pa. • Chicago, Ill. • Newark, N.J. • Putnam, Conn.



KRANE KAR
swings loads to
either side

KRANE KAR
WILL DO ANY JOB
IN AND AROUND
YOUR PLANT

KRANE KAR handles spare blooms for Blooming Mill, large slabs for Rolling Mill, charge boxes in Open Hearth, bars in Cold Drawn Bar Mill (finally loads them into railroad cars), changes rolls and bumper plates in Steel Strip Mill, and stands by to relieve heavy duty overhead cranes; transports all kinds of loads in Machine Shop, Construction and Maintenance Depts. With clamshell bucket, KRANE KAR moves sand in Welding and Foundry Depts., and coke in Coke Dept. Ask for illustrated Bulletin 89—"How Metalworking Plants Reduce Materials Handling Costs."

Gas or diesel, 12 to 37 ft. booms or adjustable telescopic booms; solid or pneumatic rubber tires. Buckets, magnets, and other accessories available.

THE ORIGINAL SWING BOOM MOBILE CRANE
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER
1½, 2½, 5, AND 10 TON CAPACITIES

KRANE KAR
TRADE MARK REGISTERED

USERS: Carnegie-Illinois, U.S. Steel, Bethlehem, Youngstown S & T, Basic Magnesium, Lima Locomotive, General Motors, Pullman Standard, etc.

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

Miscellaneous Prices—

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pot Off List	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	30%	
9/16 in. & ½ in. x 6 in. & shorter	18½	30%	
¾ in. & larger x 6 in. & shorter	17½	30%	
All diam. longer than 6 in.	14	27½	
Lag, all diam. x 6 in. & shorter	23	35	
Lag, all diam. longer than 6 in.	31	33	
Plow bolts	31		

Nuts, Hot Pressed, Cold Punched—Sq

	Pot Off List	Less Keg	K.	Less Keg	K.
½ in. & smaller	15	28½	15	28½	
9/16 in. & ½ in.	12	25	6½	21	
¾ in. to 1½ in.					
Inclusive	9	23	1	18½	
1½ in. & larger	7½	22	1	18½	

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ½ in.	16½	29½	6½	21
¾ in. to 1½ in.				
Inclusive	12	25	2	17½
1½ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ½ in.	23	35	17½	30½
¾ in. to 1½ in.				
Inclusive	19½	31½	12	35
1½ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.	Hvy.	Pot Off List
½ in. & smaller	35	45	28½ 39½
9/16 in. & ½ in.	29½	40½	22 34
¾ in. to 1½ in.			
Inclusive	24	36	15 20½
1½ in. & larger	13	26	8½ 23
7/16 in. & smaller	35	45	
¾ in. thru ½ in.	28½	39½	
¾ in. to 1½ in.			
Inclusive	26	37	

Steel Bolts

	Pot Off List
Packaged, steel, plain finished	43—10
Packaged, plated finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter. 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb	Pot Off List
½ in. & larger	77.50	
7/16 in. & smaller	74.00	

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

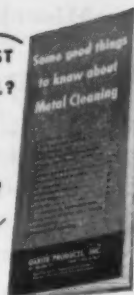
	Pot Off List
(In bulk)	
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ½ in. x 6 in., SAE 1020, bright	64
¾ in. thru 1 in. up to & including 6 in.	61
¾ in. thru ½ in. x 6 in. & shorter	44
high C double heat treat	41
¾ in. thru 1 in. up to & including 6 in.	35
Milled studs	16
Flat head cap screws, listed sizes	14
Fillister head cap, listed sizes	14
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	32

WHAT'S THE FASTEST
WAY TO CLEAN METAL?

See page 11

WHAT'S THE MOST
ECONOMICAL WAY?

See page 9



This FREE booklet on
Metal Cleaning helps you get
better production, larger profits.
Among its subjects are:

Machine cleaning Tank cleaning
Electrocleaning Pickling
Pre-paint treatment Burnishing
Steam-gun cleaning Rust prevention

Write Oakite Products,
Inc., 30H Thames St.,
New York 6, N. Y., for the 44-page
booklet: "Some good things to know
about Metal Cleaning."

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

WHAT'S
THE BEST WAY TO
STRIP PAINT FROM
METAL PARTS
TOO LARGE TO BE
SOAKED IN TANKS?

See page 3



This FREE booklet on
Paint Stripping helps you plan
better procedures. Read more about:

How to strip large areas of structural
metal? See page 5.

How to strip metal parts in large
volume? See page 9.

How to strip oil-base paints? syn-
thetic enamels? lacquers? alkyds?
phenolics? ureas? See page 12.

Write Oakite Products,
Inc., 30H Thames St.,
New York 6, N. Y., for this 14-page
booklet: "How to Strip Paint."

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in
Principal Cities of United States and Canada

Miscellaneous Prices

S. M. Ferrochrome

Contract price, cents per pound, chro-
mium contained, lump size, delivered.
High carbon type: 60-65% Cr, 4-6%
Si, 4-6% Mn, 4-6% C.
Carloads 21.60
Ton lots 23.75
Less ton lots 25.25
Low carbon type: 62-66% Cr, 4-6% Si,
4-6% Mn, 1.25% max. C.
Carloads 27.75
Ton lots 30.05
Less ton lots 31.85

ELECTRODES

Cents per lb., f.o.b., plant threaded
electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
GRAPHITE		
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2 1/2	24, 30	23.15
2	24, 30	25.36

CARBON		
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b., mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)...	*29.5	
Washgtn., Pa. (39)...	*29.5	
Claymont, Del. (29)...	*28.00	
Conshohocken, Pa. (26)	*27.50	
New Castle, Ind. (55)...	*26.50	*25.50

Nickel-carbon	
10 pct Coatesville (21)...	32.5
Inconel-carbon	
10 pct Coatesville (21)...	40.5
Monel-carbon	
10 pct Coatesville (21)...	33.5
No. 302 Stainless-copper	
stainless, Carnegie, Pa.	
(60)	77.00
Aluminized steel sheets, hot	
dip, Butler, Pa. (7)	7.75

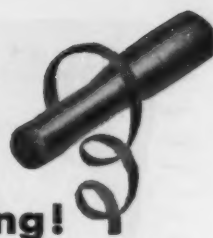
*Includes annealing and pickling, or
sandblasting.

TOOL STEEL

F.o.b. mill					Base
W	Cr	V	Mo	Co	per lb
18	4	1	—	—	\$1.505
18	4	1	—	5	\$2.13
18	4	2	—	—	\$1.65
1.5	4	1.5	8	—	\$81.0
6	4	2	6	—	96.5¢

High-carbon chromium 63.5¢
Oil hardened manganese 35¢
Special carbon 32.5¢
Extra carbon 27¢
Regular carbon 23¢
Warehouse prices on and east of Mis-
sissippi are 3.5¢ per lb higher. West of
Mississippi, 5.5¢ higher.

don't
scrap
metal
by turning!



...save by
Swaging

on

**TORRINGTON
SWAGERS**

The Torrington Rotary Swaging Ma-
chine uses every bit of stock. With
4000 hammer blows a minute, swag-
ing reduces, sizes, rounds, tapers and
points rod, wire and tubing. It makes
metal tougher and more resilient. It
hammers away minor surface defects.

Torrington Swagers are built to a
mechanical perfection based on our
42 years' swaging experience. Send
today for your free copy of the illus-
trated booklet describing the machine
and the method.

THE TORRINGTON COMPANY
Swager Department
555 Field Street • Torrington, Conn.



Send the coupon
today for your free
copy of this booklet.

Please send a copy of "The Torrington Swaging
Machine" to:

Name _____
Firm _____
Address _____

GREATER Flexibility

A Big Advantage of JOHNSON BAND SAWS

The adaptability and flexibility of Johnson Band Saws in handling all types of cutting is almost unlimited. Rods, tubes, angles, heavy rounds or flats and irregular shapes all can be cut quickly and economically . . . Model B Saw, pictured, offers the high speed and accuracy of a much larger machine. Capacity, 5" rounds and 10" flats; makes a handy saw for large or small shops; with or without casters. Also, Model J, for 10" rounds, 18" flats.

Write for catalog.

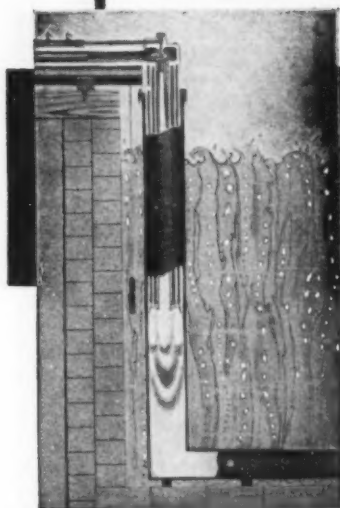


JOHNSON MANUFACTURING CORP.
ALBION, MICHIGAN

Submerged Combustion DIRECT FIRED GAS BURNERS

FOR FASTER, CLEANER
LOWER COST

PICKLING



Exposed view of Submerged Combustion Burner installed directly into pickling vat. Automatically gas fired. Thermostatically controlled to keep acid at correct pickling temperature.

- ★ Flame burns below surface of acid—heats and agitates acid for faster, cleaner pickling.
- ★ Does not dilute acids—Highly corrosion resistant—Low operating and maintenance cost.
- ★ Install in present tanks, or add new vats without adding to boiler load. Burns any type gas—natural or manufactured.

Free

Send for descriptive booklet #41 and details



SUBMERGED COMBUSTION CO.

OF AMERICA, INC.

759 LOGAN STREET

HAMMOND, IND.

Miscellaneous Prices

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags...	7.4¢ to 9.9¢
Canadian sponge iron, del'd, In East	10.00¢
Domestic sponge iron, 98+ % Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+ % Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 95+ % Fe	62.0¢ to 68.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+ % Fe	82.0¢ to 81.4¢
Aluminum	31.5¢
Brass, 10 ton lots	30.0¢ to 32.3¢
Copper, electrolytic, 10.75¢ plus metal value	
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quantity, del'd.	31.1¢
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	37.0¢
Molybdenum, 99%	32.75¢
Nickel, unannealed	38.4¢
Nickel, annealed	38.4¢
Nickel, spherical, unannealed	38.4¢
Silicon	32.4¢
Solder powder, .7¢ to 9.0¢ plus met. value	
Stainless steel, 302	81.00¢
Stainless steel, 316	81.1¢
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	16.0¢
Zinc, 10 ton lots	21.0¢ to 28.5¢

ELECTRICAL SHEETS

22 Ga. H-R cut length

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 80	Transf. 88
Beech-Bottom-15	7.25	8.50	9.30	9.85	10.40	11.10	11.80
Brackridge-28	7.25	8.50	9.30	9.85	10.40	11.10	11.80
Follansbee-23	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	7.95	9.20					
Ind. Harbor-3	6.75	7.25					
Mansfield-75	7.25	7.75	9.00	9.00			
Niles, O.-64	7.05	7.55					
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carload delivered. (65-72% Cr, 2% max. Si.)	
0.06% C ... 30.50	0.20% C ... 31.50
0.10% C ... 30.00	0.50% C ... 32.50
0.15% C ... 29.75	1.00% C ... 34.75
2.00% C ... 32.00	
65-69% Cr, 4-9% C ... 22.00	
62-66% Cr, 4-6% C, 6-9% Si ... 22.00	

Foundry Ferrochrome

Contract prices, cents per lb of alloy	
Noncontract prices add 0.25¢ per lb.	
High carbon 8 mesh and down.	
62 to 66% Cr, 5 to 7% C, 7 to 10% Si	21.50
Carloads, bulk	24.10
Carloads, packed	27.10
Ton lots, packed	27.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots.	
min. Cr, 1% max. Fe	11.1¢
0.10% max. C	12.1¢
0.50% max. C	13.1¢
9 to 11% C	14.1¢

Ferroalloy Prices

Low Carbon Ferrochrome Silicon

(Cr 24-41%, Si 42-49%, C 0.05% max.)
Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down bulk 3-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.
Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.
30-33% Ca, 60-65% Si, 3.00% max. Fe.
Carloads 19.00
Ton lots 22.10
Less ton lots 23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads 20.00
Ton lots 22.30
Less ton lots 23.30

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.
Ton lots 16.50¢
Less ton lots 17.75¢

Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed 18.00¢
Ton lots to carload packed 19.00¢
Less ton lots 20.50¢

5M2

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, 1/4 in. x 12 mesh.
Ton lots 17.50
Less ton lots 19.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.
F.o.b. Niagara Falls, Alloy, W. Va.,
Ashtabula, O. \$185
F.o.b. Johnstown, Pa. \$187
F.o.b. Sheridan, Pa. \$185
F.o.b. Etna, Clairton, Pa. \$188
\$2.00 for each 1% above 82% Mn, penalty, \$2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.
Carload, bulk 10.95
Ton lots 12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.
16-19% Mn 19-21% Mn
3% max. Si 3% max. Si
Palmerton, Pa. \$74.00 \$75.00
Ph. or Chicago 75.00 76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 34.75
Ton lots 36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 28
Ton lots 30
Less ton lots 32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn 19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.
Ton lots Cast Turnings Distilled
Less ton lots \$2.05 \$2.95 \$3.75
2.40 3.30 4.55

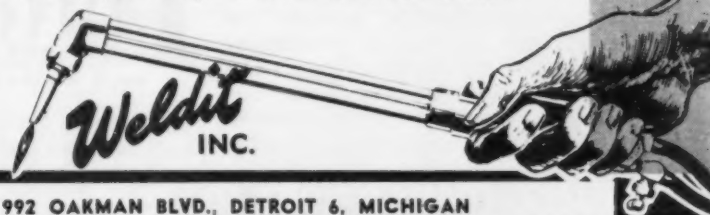
OUR COUNTRY NEEDS SCRAP!



★ Scrap isn't just a word! Scrap is tons and tons of metal . . . rusting and useless, from New York to San Francisco.

Scrap is that old machine in your shop yard, useless for years. Scrap is the old metal bed in your attic. Scrap is the pile of metal heaped in the corner of your shed. Scrap, in general, is of no use, unless it's needed . . . and brother, it's needed NOW!

26 million tons of scrap must be supplied by the public . . . by you! Call your nearest scrap dealer and keep defense production at it's peak. Help America reach it's production goal of 105 million tons of new steel.



992 OAKMAN BLVD., DETROIT 6, MICHIGAN
Canadian Distributors • Alloy Metal Sales • 881 Bay St., Toronto 5, Ont., Canada



Do you use Perforated Metal?

If perforated metal is required for any of your products, let Hendrick quote on fabricating it to your specifications. An unsurpassed stock of tools and dies, and ample plant facilities, enable Hendrick to give unexcelled service in furnishing perforated metal with any shape or size of openings from any commercially rolled metal, in any desired gauge. Write for full information.

1876—Seventy-Fifth Anniversary—1951

HENDRICK

Manufacturing Company

37 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities



Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

In the Yard or in the Plant...

EUCLID'S "pace" the Assembly Line

Euclid Cranes prove an important link in the chain of operations required to convert incoming materials into outgoing products in a vast number of manufacturing plants.

Facility of movement through ease of precision control enables "Euclids" to handle a large variety of production operations, and to readily "pace" the assembly line. Write us concerning your crane problems. We'll be pleased to submit a proposal.



THE EUCLID CRANE & HOIST CO.

1361 CHARDON ROAD
EUCLID, OHIO

NEW

THE ONLY PLANT IN EASTERN U.S.

EQUIPPED FOR

STEEL PICKLING

COILS UP TO 48" WIDE



Prompt Quality Service

- ROLLER LEVELLING
- EDGE ROLLING
- COIL SHEARING
- SLITTING

PICKLING coils:

1" to 48", 10 to 20 gauge
100 to 10,000 lbs.

SHEETS & PLATE: Any width,
any length, any thickness.

CAPACITY: 25,000 tons/month.

MARSAM CORPORATION

Subsidiary: AMERICAN TOOL & SUPPLY CO.

OFFICE: 822 FRICK BUILDING, PITTSBURGH 22, PA. PLANT: McKEES ROCKS, PA.

Ferroalloy Prices

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 3% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	11.10
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.10
Ton lots	12.70

Silvery Iron (electric furnace)

SI 14.01 to 14.50 pct. f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$92.50 gross ton, freight allowed to normal trade area. SI 15.01 to 15.50 pct. f.o.b. Niagara Falls, N. Y., \$90.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carload, bulk	6.96
Ton lots	8.86

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.00
50% Si	12.40	85% Si	15.50
90-95% Si			17.00

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd. Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	22.10	23.30
0.07% max. C	25.75	27.60	28.00
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C			
7.00% max. Si	21.25	23.10	24.30

Alsilfer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carload	9.90
Ton lots	11.30

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo.

	\$1.15
--	--------

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.

Ton lots	\$4.90
Less ton lots	4.95

Ferro - Tantalum - columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta

	\$3.75
--	--------

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.

	\$1.15
--	--------

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton

	\$65.00
10 tons to less carload	75.00

Ferroalloy Prices

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti \$1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti \$1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton \$177.00

Ferrotungsten, standard, lump or 1/4 x down, packed, per pound contained W, 5 ton lots, delivered \$5.00

Ferrovandium, 35-55%, contract basis, delivered, per pound, contained V.
Openhearth \$3.00-\$3.10
Crucible \$3.10-\$3.20
High speed steel (Primus) 3.20-\$3.25

Molybde oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. \$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. \$1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump 14.50¢
Ton lots, bulk lump 15.75¢
Less ton lots, lump 16.25¢

Vanadium pentoxide, 86-89% V₂O₅, contract basis, per pound contained V₂O₅ \$1.25

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots 21.00¢

Zirconium, 12-15% contract basis, lump, delivered, per lb of alloy.
Carload, bulk 7.00¢

Boron Agents

Contract prices per lb of alloy, del. Boron, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B \$5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound 45¢
Less ton lots, per pound 50¢

Carbortam, Ti, 15-21% B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound 10.00¢

Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots \$1.20
F.o.b. Wash. Pa.; 100 lb up
10 to 14% B85
14 to 19% B 1.20
19% min. B 1.50

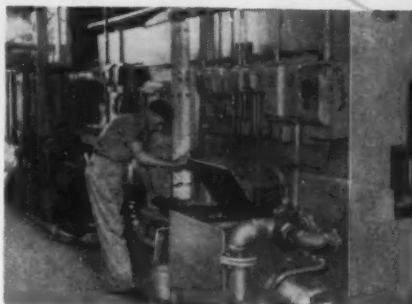
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 \$1.00
No. 6 88¢
No. 79 50¢

Manganese-Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.60% max. Si, 3.00% max. C, 3 in. x D, del'd
Ton lots \$1.46
Less ton lots 1.57

Nickel-Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots \$1.80

Silica, contract basis, delivered.
Ton lots 45.00¢

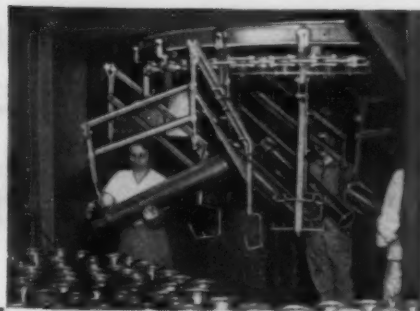
for an
engineered
conveying system



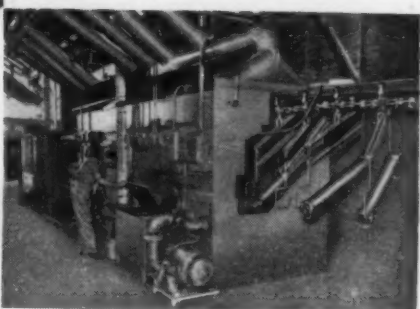
or a completely coordinated
engineered
conveying and cleaning system

write
ALVEY-FERGUSON

561 DISNEY STREET CINCINNATI 9, OHIO
Established 1901



or an
engineered
washing machine



ARMSTRONG Drop Forged LATHE DOGS



ARMSTRONG
Lathe Dogs
give extra service because
they are drop forged from
selected open hearth steel,
and are heat treated to extreme
toughness and stiffness.
Hubs are made large enough to permit re-tapping,
screws are also of special analysis steel and
are hardened at the point to prevent upsetting.
ARMSTRONG Dogs come in 10 types
with square head or safety headless screws,
with straight or bent tails. They are carried
in stock by your local ARMSTRONG Distributor.

Write for Catalog

ARMSTRONG BROS. TOOL CO.
5209 West Armstrong Ave., Chicago 30, Ill.
New York and San Francisco



Die Heads and Chasers

are precision tools made from critical materials which are becoming more difficult to get. Therefore,

it is your
**patriotic
DUTY**

- ☆ To make these tools last as long as possible
- ☆ To prevent tool breakage
- ☆ To get the largest daily production from such tools
- ☆ To reduce the amount of spoiled and rejected work
- ☆ To save all worn out chasers for scrap salvage
- ☆ To see that your machine is in good condition so that these tools can perform properly and last longer

IF you are now using H & G Die Heads and will tell which styles and sizes, we will furnish helpful literature on the care of die heads and chasers, useful charts, and place your name on our mailing list for "Die Headlines".

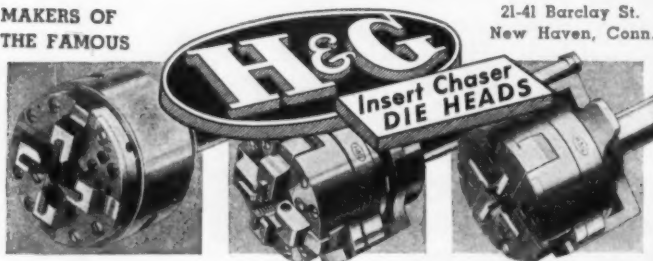
IF you are NOT using H & G Die Heads, please attach the coupon to your business letterhead with your name and title. Bulletins are sent without charge or obligation.

Check Publications Wanted

- | | |
|--|---|
| <input type="checkbox"/> REVOLVING Insert Chaser Die Heads | <input type="checkbox"/> SOLID ADJUSTABLE Insert Chaser Die Heads |
| <input type="checkbox"/> TURRET LATHE Insert Chaser Die Heads | <input type="checkbox"/> H & G Threading Machine |
| <input type="checkbox"/> B&S AUTOMATICS Insert Chaser Die Heads | <input type="checkbox"/> GUIDE to Better Threads |
| <input type="checkbox"/> TAPER THREADING Insert Chaser Die Heads | <input type="checkbox"/> SPEED CHART |

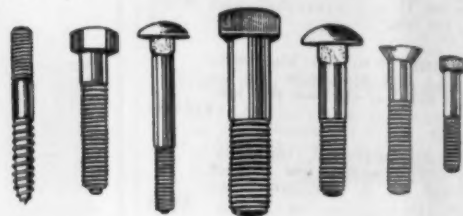
Mail to: THE EASTERN MACHINE SCREW CORPORATION

MAKERS OF
THE FAMOUS



21-41 Barclay St.
New Haven, Conn.

BOLTS, NUTS, SCREWS, LAGS in BRASS and BRONZE



Special items in large and small quantities made quickly to specifications. Send sample, sketch, or blueprint for quotation. Catalog of standard sizes on request.

A full line of IN-STOCK standard sizes and threads in Brass and Bronze listed in our catalog — or special products from special alloys made-to-order quickly.

The
JAKUES Company

69B BATTERYMARCH STREET, BOSTON, MASS.

COWLES

GANG SLITTING KNIVES

OVER 30 YEARS EXPERIENCE

Standard for Service and Durability. Ground to extremely close Tolerances and Finish. Made by Toolmakers.

**COWLES
TOOL COMPANY**

2086 W. 110th ST. CLEVELAND 2, OHIO

OHIO LOCOMOTIVE CRANES

25 TO 40 TON
CAPACITY

GASOLINE • DIESEL
ELECTRIC • STEAM

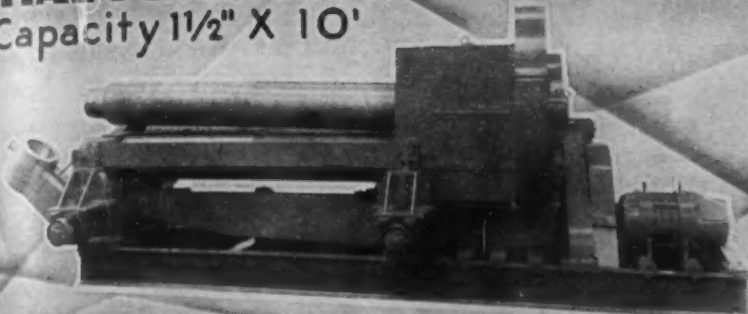


THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS, OHIO

THE IRON AGE

INITIAL PINCH TYPE PLATE BENDING ROLL

Capacity 1 1/2" X 10'



Our Line

Light and heavy machinery for all classes of sheet metal, plate and structural work.

BERTSCH & COMPANY, CAMBRIDGE CITY • INDIANA

DYKEM STEEL BLUE

STOPS LOSSES

making dies & templates

Simply brush on right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information

THE DYKEM COMPANY, 2303G North 11th St., St. Louis 6, Mo.

WIRE—STRIP, COILED FOR ELECTRIC FUSE ELEMENTS EYELETS ALSO BRASS or STEEL.

zinc

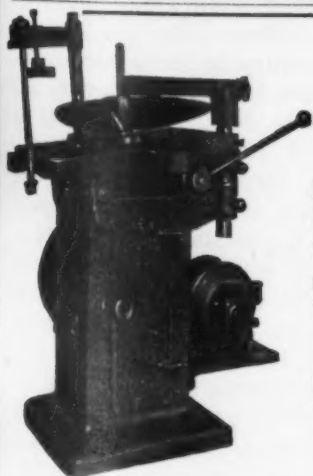
THE PLATT BROS. & CO., WATERBURY, CONN.

GOSS and DE LEEUW

MULTIPLE SPINDLE

CHUCKING MACHINES

Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.



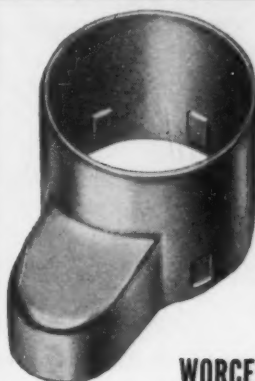
"DAVIS" KEYSEATER

Low in Cost. Durable. Easy to operate. Table adjustable for straight or taper keyways. Three sizes. Keyways 1/16" up to 1".

DAVIS KEYSEATER CO.

400 Exchange St.
Rochester 8, N. Y.

STEEL-BRASS and ALUMINUM STAMPINGS



Looking for a dependable source of supply to keep an un-interrupted flow of parts coming in on scheduled time? Our reputation is behind every promise date. Send blueprints or samples for quotation.

WORCESTER STAMPED METAL CO.

Established 1883

10 HUNT STREET • WORCESTER, MASS.

WEBB WIRE



NEEDLE

and

STAINLESS



THE CARPENTER STEEL CO.

Webb Wire Div.

NEW BRUNSWICK, N. J.

Versatility counts in
HOT DIP GALVANIZING
any size or shape product, any size
order from the smallest to the largest

Excellent facilities
for Pickling and
Oiling

ENTERPRISE

GALVANIZING COMPANY

2526 E. Cumberland St. Philadelphia 25, Pa.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS

Ingersoll Rand 33" x 20 1/2" x 24", Complete with 635 H.P. G.E. Syn. Motor 2300/3/60 2873 cu. ft. Worthington 29" x 21" & 18 1/2" x 21". Complete with Elec. Equipment

BAR TURNING MACHINES

2 1/2" Medart Type HF-2 Bar Turning Machine
6" Medart Type RFG-6 Bar Turning Machine

BENDER

Parker Model D848 Tube Bender, Motor Driven Capacity 3" O.D. Light Gauge Steel, Aluminum or Copper Tubing. Motor Dr. Mandrel Extractor

BENDING ROLL

No. 6 Hilles & Jones Pyramid Type Plate Bending Roll, Capacity 16' x 3/4" Plate Complete with Electrical Equipment

BULLDOZER

#9 William White Bulldozer, Motor Driven With 50 H.P. Motor

CRANE—ROUSTABOUT

Hughes Keenan Roustabout Crane Model MC-4 25' Gooseneck Boom, Mounted on Tractor. Equipped with pneumatic tires

CRANE—TROLLEY

40 Ton Shaw-Box Trolley, Equipped with 15 H.P. G.E. Motor. Gauge of Trolley 7'6". Lift 80'. New 1942

FLANGING MACHINES

3/4" McCabe Pneumatic Flanging Machine, Pneumatic Holdowns, Circle Flanging Attachment and numerous dies
No. 3 Blue Valley Flanging Machine. Will flange flat heads from 48" to 10' or 12' dia. Silent chain drive with A.C. Motor. Equipped with air cylinder and hydraulic pump

FORGING MACHINES

2" AJAX Upsetting and Forging Machine
5" National High Duty Forging Machine Suspended Header Slide—Guided Over and Under Arm, 50 H.P. A.C. Motor

FURNACES—MELTING

400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little used.
15 ton Herault Model V-12 Electric Melting Furnace, Top Charge hydraulically operated. Complete with Transformer Equipment

PLANERS

48" x 48" x 12' Niles-Bement-Pond, Four Head
60" x 60" x 12' Niles-Bement-Pond, Four Head
72" x 72" x 12' Niles-Bement-Pond, Four Head

PRESS—HYDRAULIC FORGING

1000 Ton United Steam Hydraulic Forging Press Quick Acting Stroke (Daylight) 4'. Distance Between Columns 31". RtoL 72" Intensifier and Accumulator included, also 8000 lb. Alliance Straight Line Manipulator. NEW 1942

PRESS—HYDRAULIC WHEEL

100 ton Elmas Inclined Hydraulic Wheel Press, 72" Between Parallel Bars, Complete with Pump & Motor

ROLLING MILLS

12 1/2" x 16" Philadelphia Two High Cold Rolling Mill, Complete with Pinion Stand, 75 H.P. Motor 440/3/60, Starter and Controls, Incl. Coiler
18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill, Complete with Elec. Equip.
20" x 24" Philadelphia Two High Cold Rolling Mill, Complete with Pinion Stand, 250 H.P. Motor 440/3/60, Starter and Controls

SAW

No. 75 United Sliding Frame Saw, 52" Dia. x 3/8" Thick Blade, 48" Stroke, Complete with Elec. Equipment

TESTING MACHINES

10,000# Olsen Universal Wire Testing Machine
20,000# Southwark S10C Universal Hydr. Testing Machine
120,000 lb. SOUTHWARK-TATE-EMERY Universal Hydraulic Testing Machine LATE
300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine

WELDERS

700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 6" to 35" Diameter x 12" Wide
40 KVA Slatky, Spot Welder, 36" Throat 440/3/60 operation

ITTERBUSH & COMPANY INC.

50 Church Street, New York 8, N. Y.

Phone—Cort 7-3437

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

The Chicago used machinery market remains sluggish—partly from the effects of pricing controls and scarcity of good equipment.

Some dealers believe that CPR 80 (pricing regulation covering used machine tools) will slow the passage of used machines into the market. Reasoning runs thusly: Plant owners will think twice before releasing equipment now in use. Replacing those machines with new ones must be done at higher prices.

Long delivery time on the new tools is still a factor encouraging holding on to old machines. Controls are also said to have reduced dealer to dealer activity substantially.

Wheel Clarification — Chicago dealers are hoping for quick clarification of CPR 80 so they will be able to price more easily and accurately. They do not want to exceed the ceilings but claim CPR 80 is hazy and sometimes impossible to comply to.

Some dealers, unable to get all the pricing information they need, are forced to compute new prices as best they can. They hope these prices are right or nearly right. They feel that this practise is acceptable if they can show intent was to abide by CPR 80 to the best of their ability.

Demand Strong — Despite hampering regulation, demand in Chicago for all types of production equipment remains heavy. Shortage of late model machines is forcing some inquiries into older types of equipment. Some dealers report increasing activity in older machines.

Chicago area rebuilders are crammed to the doors with work. They are showing more reluctance to take on rebuilding orders for the Air Force.

Open House — Interstate Machinery Co., Chicago, held an exposition and open house for its customers at its Pershing Rd. plant from Nov. 14 through Nov.

17. Interstate management estimates that more than 500 visitors attended the exhibit.

The show was first held last year in conjunction with the Metals Show, held in Chicago. It was continued this year. On Nov. 19, Interstate was host to the Chicago Chapter of Machinery Dealers' National Assn. A banquet followed the monthly meeting.

Want Price Book — Used machine tool dealers all over the country are looking to Washington for publication of an official price book to make CPR 80 practical. They are having troubled times trying to unearth new prices.

First, makers of new machine tools have troubles enough of their own without answering countless individual queries of their prices. Then, some builders are reluctant to give such information on the claim that special engineering makes a solid price impossible.

Absorb Charges — Used machinery dealers, nevertheless, resent service charges asked by new machine tool builders for price information. They must absorb these charges under an inflexible pricing order.

Dealers report that service charges have been running from \$5 to \$10—with some much higher. They contend they should not be stuck with these bills. Solution, it is generally agreed, is issuance of an OPS price book such as was published by old OPA.

ACA Meets — The first Washington meeting of the American Rebuilders Assn., 6411 Barnaby St., Wash. 15, D. C., was to be held on Nov. 27 and 28. Subject was revising standards for rebuilding machine tools, electrical equipment, and industrial machinery.

ARA will suggest revision of CPR 80. It says the regulation handicaps rebuilders to such an extent that "many of the reputable and long-established firms are giving serious consideration to going out of that business."



Under the provisions of the revised building code of the City of Los Angeles, lightweight steel construction and hollow steel floor panels were used to advantage in the new Tishman office buildings. Bethlehem Pacific fabricated and erected the steelwork.

12-Story Triplets for Tishman

These three modern office buildings are being erected on Los Angeles' celebrated Wilshire Boulevard for Tishman Realty and Construction Company of New York. The buildings are identical, limit-height structures. They will provide some 600,000 sq ft of office space in a highly desirable location just west of the Ambassador Hotel.

The structural steel frames of these buildings are unusually light, weighing only 11 lbs per sq ft of floor area. Under

the modern building code of the City of Los Angeles, cellular light-gage steel floor panels were used as diaphragms to resist seismic forces. Suspended ceilings and vermiculite plaster were used to envelop the steel beams for fireproofing instead of the massive concrete encasement required by earlier building codes. This materially reduced the dead load, cut construction costs, and saved erection time. A reinforced-concrete central utility core extending up through each

building provides all services, including elevators and air-conditioning. Windows occupy three-quarters of the exterior wall surface of each building.

Bethlehem Pacific fabricated and erected the steelwork for the three Tishman office buildings. The architect is Claud Beelman; Herman Spackler is associate architect; engineers are Brandow and Johnson; general contractor is C. L. Peck—all of Los Angeles.

BETHLEHEM PACIFIC COAST STEEL CORPORATION
General Offices: San Francisco



BETHLEHEM PACIFIC

December 13, 1951